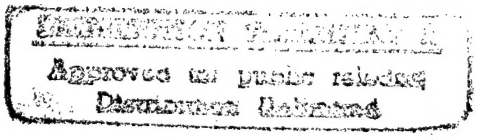
POPULATION ECOLOGY OF THE MALLARD

IV. A Review of Duck Hunting Regulations, Activity, and Success, With Special Reference to the Mallard



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POPULATION ECOLOGY OF THE MALLARD

IV. A Review of Duck Hunting Regulations, Activity, and Success, With Special Reference to the Mallard

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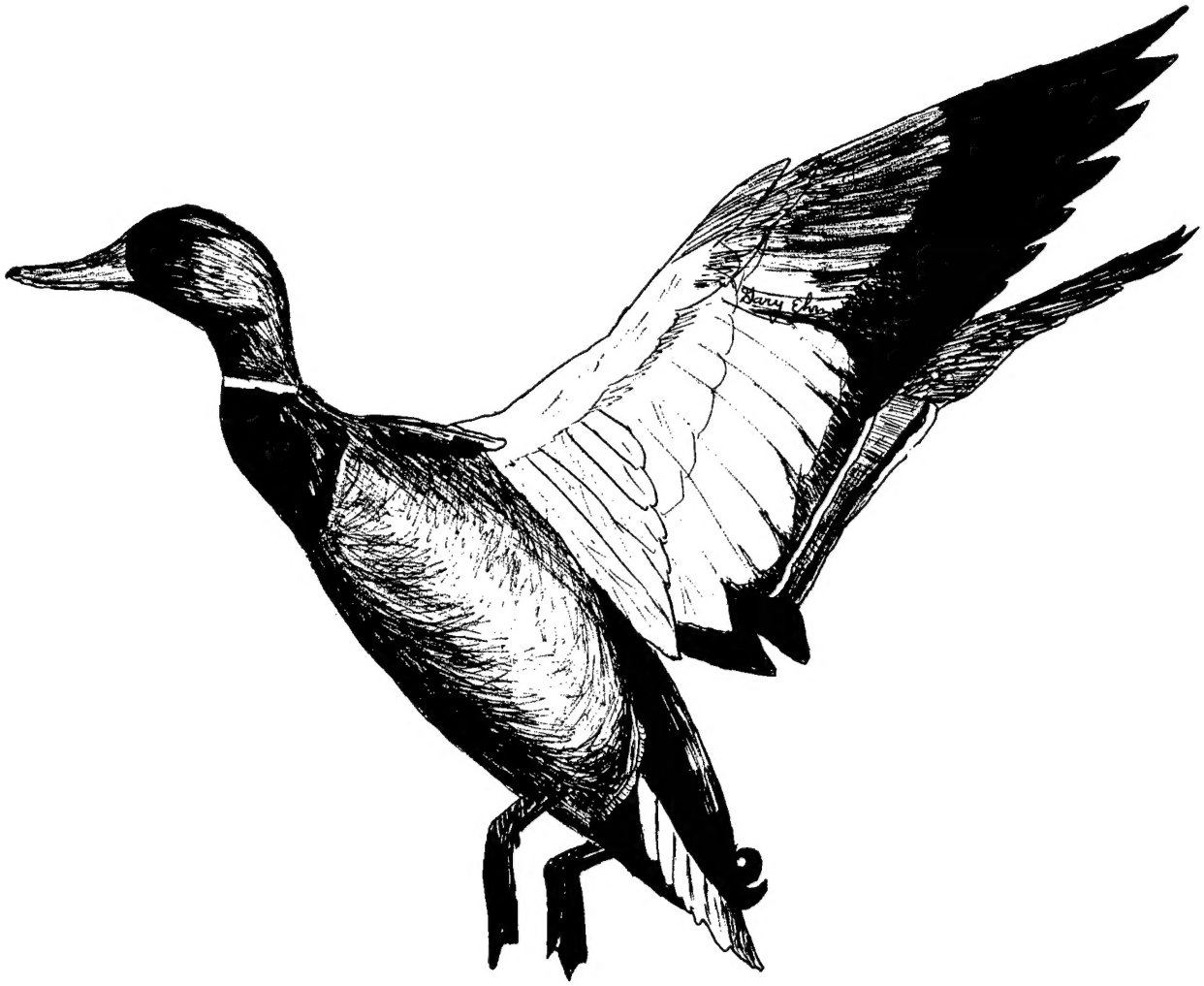

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ABSTRACT

This, the fourth in a series of reports on the mallard, *(Anas platyrhynchos),* deals at length with the harvest of mallards by waterfowl hunters. Long-term summaries of duck hunting regulations (1948-1974), Migratory Bird Hunting Stamp sales (1934-1974), Hunter Questionnaire (1952-1974), Duck Wing Collection (1960-1974), and Hunter Performance (1965-1972) Survey data for the United States are presented and discussed. Similar data from Canada are also summarized. Mallard harvest figures for 1961-1974 are presented by Mallard Harvest Area, of which 100 are defined for the United States and 14 for Canada, as well as by State or Province and flyway.

During the 23-year period beginning in 1952, an average of 1.6 million adult and 0.2 million junior waterfowl hunters accumulated almost 12.3 million hunter-days of recreation and a harvest of 11.2 million ducks each year. Hunter reports indicate that mallards made up about 43% (5.5 million annually) of the ducks taken before 1960, when mallard regulations were less restrictive; the Duck Wing Survey indicates that mallards have made up 33% of the harvest (3.6 million annually) since 1960. The age and sex compositions and the chronological distribution of the mallard harvest are examined in detail. Among the patterns noted are peak harvests during the first few days of the season in many States, alternately increasing and decreasing annual age ratios, and sex ratios that suggest differential migration of adult drakes and hunter selectivity for males. It is estimated that almost 19% of the ducks shot down are not retrieved.

Relationships between duck hunting regulations and hunter behavior are examined briefly. Hunter compliance with mallard bag limits, hunter selectivity of mallards by sex, and, to a lesser extent, the size of the unretrieved kill are all sensitive to the particular bag limit regulations in effect. Survey data are also examined for relationships between harvest and various hunting regulations: starting time and day of the week for opening day, opening date, season length, split seasons, daily shooting hours, and daily bag limits. Tables are presented relating changes in duck and mallard harvests to season length and bag limit, and examples of what effects changes in other regulations have on harvest are also given.

The evaluation of bag limit regulations, one of the most important tools used in managing harvest, is carried a step further with the development of a procedure for calculating expected hunter success under a wide variety of bag limit regulations. This method appears promising for evaluating point-limit as well as fixed-limit regulations. In addition, it may provide useful measurements of the degree of hunter selectivity induced by various types of bag limit regulations, an increasingly important aspect of harvest management. Finally, this study clearly demonstrates that the effects of a particular regulation can differ dramatically from area to area, so it is usually necessary to evaluate each proposal on a State-by-State basis.

INTRODUCTION

This is Part IV in a series of comprehensive reports on the ecology of the mallard *(Anas platyrhynchos)* in North America. As indicated in Part I (Anderson and Henny 1972), this study can be divided into two basic phases: (1) providing comparable summaries of statistics relating to specific subjects, and (2) identifying and discussing findings having significance for management and research. The present report fits largely into the first category. It reviews and summarizes long-term hunting regulations, duck stamp sales, and data from the U.S. Fish and Wildlife Service's Hunter Questionnaire Survey, Duck Wing Collection Survey, and Hunter Performance Survey. One hundred U.S. Mallard Harvest Areas are described, and the post-1960 harvest data are summarized by harvest area as well as by State and flyway. A resumé of similar information is also presented for Canada.

In addition, relationships within this body of data are analyzed with emphasis on the effects that various duck hunting regulations have on hunter activity and success. A knowledge of relationships between hunting regulations and mallard harvest is the first step in achieving the larger goal of understanding the relationships between regulations and mallard population dynamics. At least two relationships remain to be investigated: that between mallard harvest and hunting mortality and that between hunting mortality and survival rate.

REVIEW OF U.S. DUCK HUNTING REGULATIONS

Since hunting patterns can have important effects on the population dynamics of a game species, a knowledge of past hunting regulations coupled with an analysis of their effects should lead to sounder game management policies through improvements in and more effective use of hunting regulations. The regulation of hunting is one of the most basic aspects of game management and the *raison d'etre* for much of the research in this field.

The 27-year period 1948-1974 during which regulations have been flyway-oriented is reviewed here because it encompasses the time span of primary interest in the present study and will be useful for other studies as well. Tables 1 and 2 summarize regulations for the regular duck hunting season by year and flyway. Table 1 covers season length and basic daily bag and possession limits for ducks and for mallards, and Table 2 covers shooting hours. Table 3 is a checklist of special and experimental duck hunting seasons and other special species-oriented regulations on ducks and mergansers, essentially by flyway.

More detailed tables in the Appendix show basic duck limits together with bonuses, restrictions, and separate limits by year and flyway for the regular duck season (Table A-1) and season dates, season length, and basic duck and mallard bag and possession limits by year and State for the regular duck season (Table A-2). Also presented are summaries of hunting regulations for the Columbia Basin (Table A-3), San Luis Valley (Table A-4), and "High Plains" (Table A-5) seasons. As indicated in most tables, some States have enacted regulations more restrictive than those shown. An example is the traditional noon opening on the first day in Washington and Wisconsin. In California, State restrictions and local custom combine to restrict most hunting to Saturdays, Sundays, and Wednesdays. Such exceptions are not included in these summaries. The information shown is from Federal Regulatory Announcements, and these routinely advise the reader to "check State regulations for additional restrictions."

Federal regulations provide that if a State must close its hunting season in a large area because of the threat of forest fire, it may extend or reopen the season later in the year. Such fire emergencies have occurred, as in parts of a number of northeastern States in 1963. Details of such incidents are incomplete, but the summaries include what information is available. Federal regulations also restrict hunting methods and equipment. For example, they prohibit the use of bait and live decoys, prohibit the use of rifles and of shotguns larger than 10 gauge or holding more than three shells, and restrict the use of powered boats. The full list, complete with

Table 1. Summary, by flyway, of season lengths (days) and basic limits (daily bag:possession) for ducks, with mallard limits shown in parentheses when different, for the regular duck hunting season, 1948-1974[a/]

Hunting season	Alaska		Pacific Flyway		Central Flyway		Mississippi Flyway		Atlantic Flyway	
	Days	Basic limits	Days	Basic limits	Days	Basic limits	Days	Basic limits	Days	Basic limits
1948-49[b/]	40	5:10	40	5:10	35	5:10	30	4:8	30	4:8
1949-50	50	5:10	50	5:10	45	4:8	40	4:8	40	4:8
1950-51	55	6:6	55	6:6	45	5:10	35	4:8	40	4:8
1951-52	55	5:10	60	6:6	50	5:10	45	4:8	45	4:8
1952-53	55	5:10	70	6:6	60	5:10	55	4:8	55	4:8
1953-54[c/]	75	7:14	75	7:7	60	5:10	55	4:8	60	4:8
1954-55	75	7:14	80	6:12[d/]	60	5:10	55	4:8	60	4:8
1955-56	83	7:14	80	6:12[d/]	75	5:10	70	4:8	70	4:8
1956-57	83	7:14	80	6:12[d/]	75	5:10	55-70	4:8-5:10	70	4:8
1957-58	90	7:14	95	5:10[d/]	75	5:10	70	4:8	70	4:8
1958-59	94	7:14	95	5:10[d/]	75-90	4:8-5:10	70	4:8	60	4:8
1959-60	94	7:14	94	5:10	50-60	3:6-4:8	40-50	3:6-4:8	40-50	3:6-4:8
1960-61	94	5:10	75-90	4:8[d/]-6:6	50-60	3:6-4:8	40-50	3:6-4:8	40-50	3:6-4:8
1961-62	105	5:10	60-75	4:8[d/]-5:10	30-40	2:4-3:6	20-30	2:4-3:6	40-50	2:4-3:6
1962-63	105	5:10	75	4:8[d/]	25	2:4 (1:2)	25	2:4 (1:2)[e/]	40-50	2:4-3:6 (2:4)[e/]
1963-64	105	5:10	75-90	4:8[d/]-5:10[d/]	35	4:8 (2:4)	35	4:8 (2:4)[e/]	40-50	3:6-4:8 (2:4)[e/]
1964-65	105	5:10	75-90	4:8[d/]-5:10[d/]	40	4:8 (2:4)	40	4:8 (2:4)	40-50	3:6-4:8 (2:4)
1965-66	105	5:10	75-90	4:8[d/]-5:10 (3:5-3:6)[f/]	40	4:8 (1:2)	40	4:8 (1:2)	40-50	3:6-4:8 (2:4)
1966-67	105	5:10	75-90	5:10[d/]-6:12[d/]	50-60	3:6-4:8 (2:4)	45	4:8 (2:4)	45-55	3:6-4:8
1967-68	105	6:12	75-90	5:10[d/]-6:12	50-60	3:6-4:8 (2:4)	40	4:8 (2:4)	40-50	3:6-4:8
1968-69	105	6:12	86	5:10[d/] (3:3-3:6)	30-40	3:6-4:8 (2:4)	20-30	3:6 (1:2-2:4)	40-50	3:6-4:8 (2:4)
1969-70	105	6:18	86	5:10[d/]	40-55	4:8 (1:2-2:4)	30-40	4:8 (1:2-2:4)	47-57	3:6-4:8
1970-71[g/]	105	6:18	93	6:12[d/]	70-90	5:10 or points[h/]	45-55	6:12 (2:4) 4:8-points	50-60	3:6-4:8 or points
1971-72	105	6:18	93	6:12[d/]	70-90	5:10 or points	50	6:12 (2:4) 4:8-points	50-60	3:6-4:8 or points
1972-73	105	6:18	93	6:12[d/]	70-90	5:10 (2:4♀) or points	50	6:12 (2:4) 4:8-points	45-60	3:6-4:8 5:10 (4:8) or points
1973-74	107	6:18	93	5:10[d/]	51-76	5:10 (2:4♀) or points	40-45	5:10 (2:4) 4:8-points	40-50	4:8-5:10 or points
1974-75	107	6:18	93	5:10	51-65	5:10 (3:6) or points	45-50	4:8 (2:4) or points	45-55	4:8-5:10 or points

a/ Exclusive of shorter seasons or lower limits occasionally enacted at the option of individual States.
b/ Option of split season with 20% fewer days selected by some States during 1948-1952 except 15% fewer days in Pacific Flyway in 1948.
c/ Option of split season with 10% fewer days selected by some States during 1953-1969.
d/ Option of equal daily bag and possession limits one bird higher than daily bag limit shown selected by some States in the Pacific Flyway.
e/ Aggregate limit for mallard and northern black duck (*Anas rubripes*).
f/ Aggregate limit for mallard and northern pintail (*A. acuta*).
g/ Option of split season with no reduction in length selected by some States beginning in 1970.
h/ Each type (species, sex) of duck is assigned a point value, and the bag limit is reached when the last bird taken causes a hunter's point total to reach or exceed a specified value (usually 100 points).

Table 2. Summary of shooting hour regulations for duck and coot (*Fulica americana*), 1948-1974, (excluding some experimental and special seasons and local exceptions).

Hunting season	Flyway					Shooting hour (standard time) and State group designations
	Alaska	Pacific	Central	Mississippi	Atlantic	
1948-49 through 1952-53	A,N	A,N	A,N	A,N	A,N	General shooting hours
1953-54	B,N	B,N	B,N	B,N	B,N	A = 1/2 hour before sunrise to 1 hour before sunset.
1954-55	B,N	B,N	B,N	A in Group 1 B in others, N	B,N	B = 1/2 hour before sunrise to sunset.
1955-56	B	B	B	C	B	C = 1/2 hour before sunrise to 1/2 hour before sunset.
1956-57	B	B	B	C,E	B	D = sunrise to sunset.
1957-58	B	B	B	C in Group 2 B in others, E	B	E = 1/2 hour before sunrise to 4:00 p.m. in Wisconsin during 1956-1958 and in Minnesota during 1973.
1958-59	B	B	B	C in Group 3 B in others, E	B	Opening day exceptions
1959-60	B	D,N	D,N	D,N	D,N	N = 12 o'clock noon starting time on opening day(s) except 1:00 p.m. on opening day(s) in Wisconsin during 1950-1954 (local time in 1974).
1960-61	B	B,N	B,N	B,N	B,N	
1961-62 through 1963-64	B	B,N	D,N	D,N	D,N	State groups
1964-65 and 1965-66	B	B	D	D	D	Group 1 = Alabama, Arkansas, Illinois, Iowa, Mississippi, Missouri, and Tennessee.
1966-67 through 1969-70	B	B	B	B	B	Group 2 = Alabama, Arkansas, Louisiana, Mississippi, Ohio, and Tennessee.
1970-71	B	B	[D in Group 4; B in others]			Group 3 = Alabama, Louisiana, Mississippi Ohio, and Tennessee.
1971-72	B	B	B	B	B	Group 4 = Colorado, Illinois, Iowa, New Jersey, Montana, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming.
1972-73	B	B	B	D in Group 5 B in others	B	Group 5 = States using point system (Iowa, Illinois, and Michigan).
1973-74	B	B	B	D in Group 6 B in others, E	B	Group 6 = States using point system (Iowa, Illinois, Louisiana, Michigan, Missouri, Ohio, and Wisconsin).
1974-75	B	B	B	[B; N except in Group 7]		Group 7 = Iowa and Pennsylvania; parts of Ohio and Connecticut.

Table 3. Checklist of special and experimental duck hunting seasons and other special species-oriented regulations in effect on ducks and mergansers in the United States during 1948-1974, exclusive of the more restrictive regulations occasionally enacted by individual States.

Special regulation	Flyway (F), State, or other area affected	Hunting season: 1948-49	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75
Special and experimental seasons																												
Extended:																												
Sea duck	Alaska			X	X	X		X	X	X	X							X	X	X	X		X	X	X	X	X	X
	Atlantic F	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Merganser	Alaska			X	X			X	X	X	X																	
Sea duck/merganser	Alaska										X																	
Columbia Basin	Pacific F													X	X			X	X	X	X	X	X	X	X	X	X	X
San Luis Valley	Colorado																	X	X	X	X	X	X	X				
September Teal	Central F																		X	X	X			X	X	X	X	X
	Mississippi F																		X	X	X			X	X	X	X	X
	Maine																								X	X	X	
Late Black Duck	Atlantic F																			X	X							
Special Scaup	Central F																					X		X	X			
	Mississippi F																					X			X	X	X	X
	Atlantic F																			X		X	X	X	X	X	X	X
Special Scaup/Ringneck (*Aythya collaris*)	Atlantic F																			X								
Special Scaup/Goldeneye	Vermont																											X
	New York																											X
High Plains	Central F																					X	X					
Bonuses																												
Pintail	Pacific F																											X
Pintail/wigeon (*Anas americana*)	Pacific F				X			X	X	X	X	X																
Scaup	Alaska																	X	X									
	Central F													X								X						
	Mississippi F													X				X	X	X	X	X	X	X	X	X	X	X
	Atlantic F													X				X		X	X	X	X	X	X	X	X	X
Scaup/ringneck	Mississippi F																		X									
	Atlantic F																		X									
Blue-winged teal (*A. discors*)	Central F																					X	X	X	X		X	X
	Mississippi F																					X	X	X	X		X	
	Atlantic F																						X	X	X		X	X
Restrictions																												
Canvasback (*Aythya valisineria*)	Pacific F																		X		X	X	X		X		X	X
	Central F																		X	X	X							
	Mississippi F																		X	X	X							
	Atlantic F																		X	X	X							
Redhead (*A. americana*)	Pacific F																											X
Canvasback/redhead	Alaska																		X									
	Pacific F																	X										
	Central F											X						X				X	X	X	X		X	X
	Mississippi F											X						X				X	X	X	X		X	X
	Atlantic F											X						X				X	X	X	X			

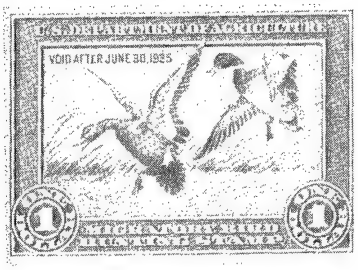
Table 3.--continued. Checklist of special and experimental duck hunting seasons and other special species-oriented regulations in effect on ducks and mergansers in the United States during 1948-1974, exclusive of the more restrictive regulations occasionally enacted by individual States.

Special regulation	Flyway (F), State, or other area affected	Hunting season																								
		1948-49	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75
Canvasback/redhead/ ruddy (*Eriomatura jamaicensis*)	Pacific F											X																
	Central F											X																
	Mississippi F											X																
	Atlantic F											X																
Wood duck (*Aix sponsa*)	Alaska	X	X	X																								
	Pacific F	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
	Central F	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Mississippi F	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Atlantic F	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hooded merganser (*Lephodytes cucullatus*)	All but Alaska						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Black duck	Mississippi F																					X						
	Atlantic F													X						X		X	X	X	X	X	X	X
Mallard/black duck	Mississippi F														X	X	X											X
	Atlantic F														X	X												
Mallard	Pacific F																					X						
	Central F														X		X	X	X	X	X	X	X		X		X	X
	Mississippi F																	X	X	X	X	X	X	X	X	X	X	
	Atlantic F																	X	X			X				X		
Mallard/pintail	Pacific F																		X									
Pintail	Central F																		X									
	Mississippi F																		X									
Closures																												
Wood duck	Pacific F	X	X	X	X	X	X	X																				
	Central F	X	X	X	X	X	X	X				X	X	X														
	Mississippi F							X		X	X	X																
	Atlantic F	X	X	X	X	X	X	X																				
Canvasback	Pacific F																								X		X	X
Canvasback/redhead	Alaska													X	X		X	X										
	Pacific F												X	X	X		X											
	Central F												X	X	X		X								X		X	X
	Mississippi F												X	X	X		X								X		X	X
	Atlantic F												X	X	X		X								X		X	X
Mexican duck (*Anas diazi*)	Arizona																										X	X
	New Mexico																										X	X
	Texas																										X	X
Differential limits under point system	Central F																							X	X	X	X	X
	San Luis Valley																					X	X	X				
	High Plains Area																						X					
	Mississippi F																							X	X	X	X	X
	Shiawassee Area																						X	X				
	Atlantic F																							X	X	X	X	X

technical wording, is rather lengthy, and some States enforce additional restrictions.

It should be noted that other, more general, State regulations also affect waterfowl hunting. Most States in the Atlantic Flyway and a few other States prohibit hunting on Sunday. Another factor that may influence hunting pressure is the timing of opening day—whether the waterfowl season opens concurrently with other game seasons and whether it opens on a weekday or weekend. Some of these situations are discernible in the summaries and some are not, but the pattern hunting pressure takes will reflect the influence of these and numerous other "secondary" regulations.

The regulatory side of waterfowl management is complex, but familiarity with it will be vital in examining the results of later analyses.



DUCK STAMP SALES

Since 1934, when the Migratory Bird Hunting Stamp Act went into effect, all waterfowl hunters 16 years old or older have been required to carry a Federal Migratory Bird Hunting Stamp, popularly known as a "duck stamp" (and to be officially known as a "Migratory Bird Hunting and Conservation Stamp"), while hunting waterfowl in the United States. These stamps, valid for one hunting season, are sold at all first- and second-class post offices and at other post offices having a demand for them. The number of duck stamps sold each season is recorded by the U.S. Postal Service, and all sales figures available through June 1975 are summarized by hunting season, State, and flyway in Table A-6. Flyway totals are presented graphically in Fig. 1.

Since records of stamp sales depend on accounting effort in thousands of post offices throughout the country every year, errors occasionally occur. When an error and its correction are made in different fiscal years, stamps are recorded as having been sold the year before or the year after they were actually sold. Thus the figures for 2 years are affected, and the accounting procedures contain no provisions for their correction. In recent years, the Postal Service has been able to provide enough additional information to correct a few such errors. These corrections have been incorporated into Table A-6 resulting in some figures that do not agree with those previously available. Most errors in duck stamp sales figures involve only a few stamps, but occasional discrepancies of several hundred to several thousand have been noted, and undoubtedly others remain undetected.

Another type of error occurs in records from the Philatelic Sales Unit. Duck stamps usually remain on sale to stamp collectors at the Philatelic Sales Unit for 2 years after the hunting season for which they were valid. Such sales are not recorded by year of stamp issuance, so these figures always contain

substantial (and unknown) numbers of older stamps assigned, for bookkeeping convenience, to the current year. These sales do not, of course, reflect hunting activity and therefore have no effect on the other matters discussed in this report.

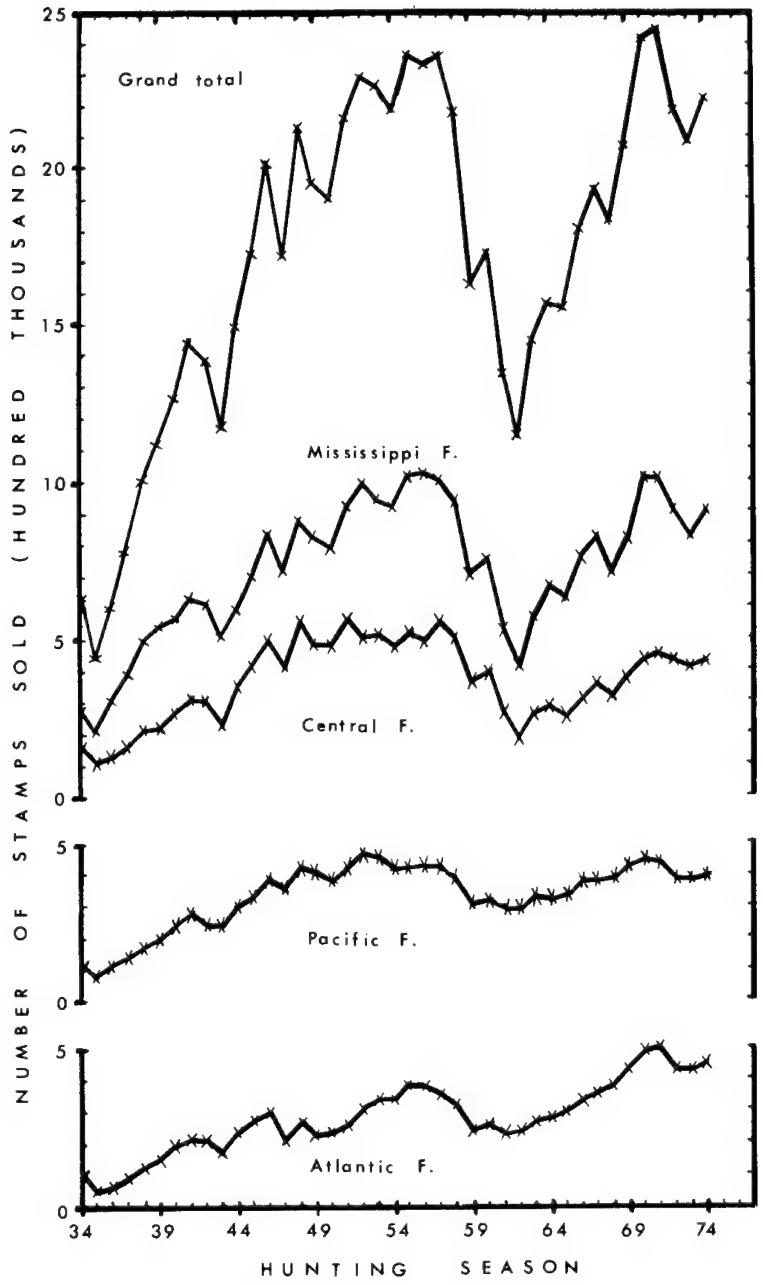


Fig. 1.—Trends in annual duck stamp sales, by flyway, during the first 41 years of issuance.

STUDY UNITS: U.S. MALLARD HARVEST AREAS

The concept of a continental mallard population is of limited usefulness to many individuals involved in waterfowl management. They deal with the mallard subpopulation in their area of operation, be it a single banding station, a State, a flyway, or some other unit. They are concerned first of all with the origin and fate of "their own" particular birds. The first report in this series (Anderson and Henny 1972) defined mallard harvest areas along State lines. Such political boundaries govern differences in waterfowl regulations, but it is also convenient to use these political units and their arbitrarily defined subpopulations as a starting point in the investigation of natural subpopulations of the mallard.

A natural subpopulation can be defined as a group of birds that all come from the same breeding ground, follow the same migration route, and share a common wintering ground. This "biologist's definition" fragments the mallard population into countless overlapping subpopulations. A bird will be a member of only one natural subpopulation but may belong to many political subpopulations. The work of the practical waterfowl manager requires a compromise between these biological and political views of the mallard population. Since management is carried out on an area basis and any given area contains a mixture of natural subpopulations that are inseparable for management purposes, the manager is interested primarily in the characteristics of this mixture as a whole, but he must also maintain a strong interest in the characteristics of its components.

A major consideration in defining the boundary of a harvest area was population homogeneity, as indicated by the distributions of recovery sites for birds banded in the area and of banding sites for birds recovered in the area. Other requirements were that the area have a large enough mallard population to warrant individual attention and enough data on population and harvest to permit a meaningful investigation. Finally, because of the practical limitations of handling, presenting, and comprehending the large volume of tabular material involved, it was decided that the number of harvest areas in the United States be limited to about 100 and that those within States be delineated along county lines.

Procedures followed in delineating harvest areas included a general overview of the body of data available, consultation with Service and State personnel familiar with local situations, and examination of band recovery derivation data by the procedure for finding the angle between two vectors (Kolman 1970). The theory involved in vector analysis is fairly abstract, but the procedure itself, as adapted to the present study by Service biologists, is straightforward. The technique allows comparisons between pairs of units—in this case, degree blocks in which banded mallards are harvested. The measurements compared are the numbers of recoveries, in each degree block, of birds banded in each banding reference area. By definition, the total number of recoveries in degree block A, T_A, is the sum of the recoveries, X_i, from banding reference areas 1 through 44:

$$T_A = \sum_{i=1}^{44} X_i = X_1 + X_2 + \ldots + X_{44}$$

Similarly for block B, with recoveries denoted by Y_i,

$$T_B = \sum_{i=1}^{44} Y_i = Y_1 + Y_2 + \ldots + Y_{44}$$

These figures may include all recoveries, either weighted or unweighted, or a selected group of recoveries such as direct, indirect, or recoveries from preseason bandings. In the present study, direct and indirect recoveries were examined separately. Any of the X or Y terms may be zero (no recoveries) but as T_A and T_B decrease the method becomes less effective.

The statistic of interest in this study is the vector angle whose cosine is

$$\cos \phi = \frac{X_1 Y_1 + X_2 Y_2 + \ldots + X_{44} Y_{44}}{\sqrt{X_1^2 + X_2^2 + \ldots + X_{44}^2}\sqrt{Y_1^2 + Y_2^2 + \ldots + Y_{44}^2}}$$

where ϕ, the vector angle, is always between 0° and 90°. (This angle is in no way related to directional angles.) A small angle indicates similarity in the derivation of recoveries for the pair of degree blocks thus compared, whereas a large angle indicates dissimilarity. These calculations thus provide a quantitative index for evaluating the placement of harvest area boundaries.

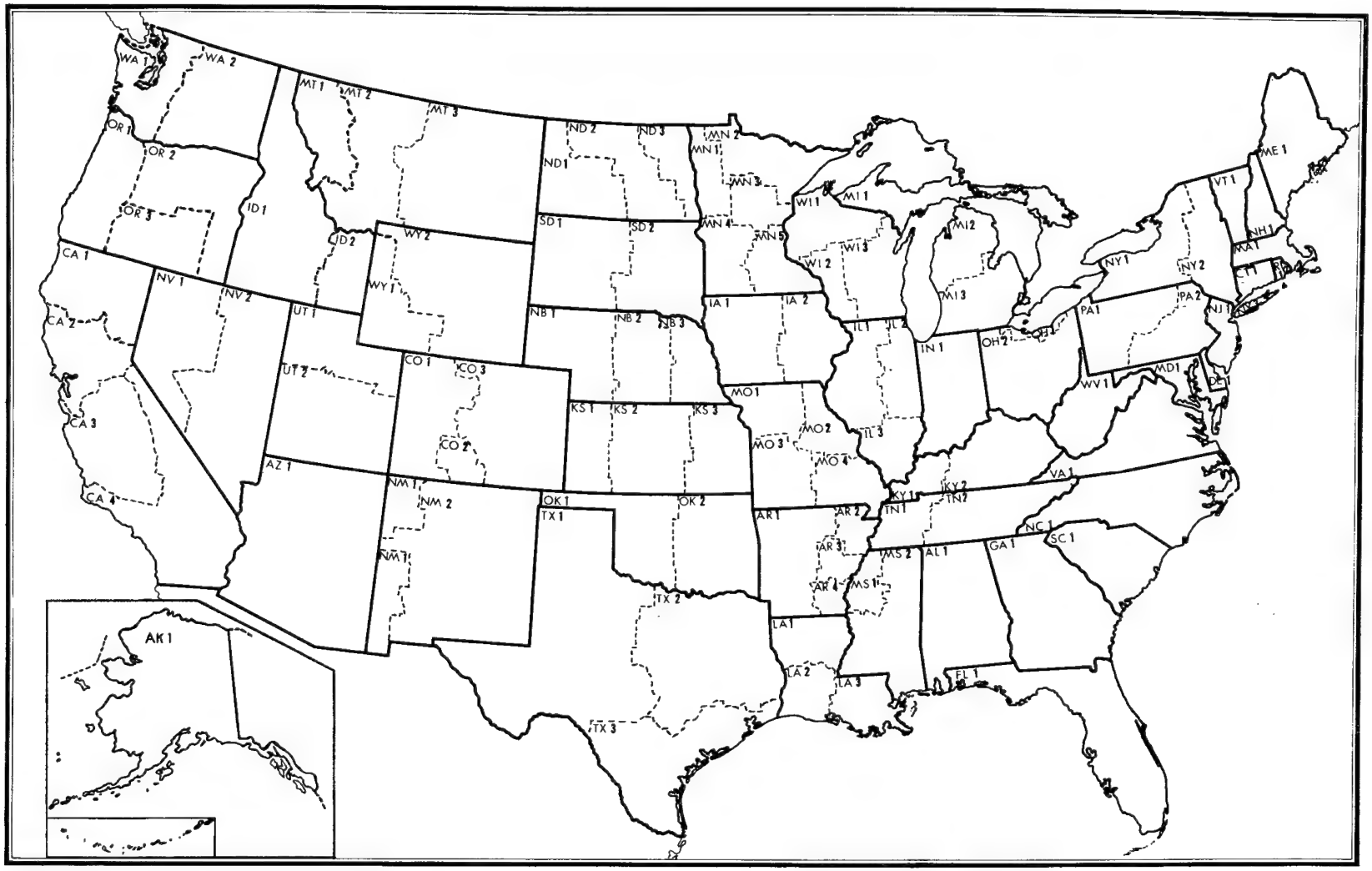


Fig. 2.—Outline map of U.S. mallard harvest areas as defined for the current mallard study.

The mallard harvest areas established for this study are mapped in Fig. 2; complete boundary descriptions are detailed by State in Table A-7. Alaska is a single area, the Pacific and Central Flyways, as presently constituted, each contain 21 areas, and the Mississippi and Atlantic Flyways contain 37 and 20 areas, respectively, for a total of 100 harvest areas in the United States. Canada has been divided into 14 areas, and Mexico is undivided, so the total for North America is 115.

U.S. HARVEST DATA SOURCES: PROCEDURES AND LIMITATIONS OF EACH SURVEY

The Fish and Wildlife Service has conducted an annual Mail Questionnaire Survey of U.S. Waterfowl Hunters since 1952, a Cooperative Waterfowl Parts Collection Survey (Duck Wing Survey) of national scope each season since 1961, and an annual Hunter Performance Survey (Spy-blind Survey) in many areas from 1961 through 1972. These are the primary sources of the data on U.S. waterfowl hunting activity and success presented in this report. Though all three are interrelated, each has its own objectives, structure, and limitations. Since many of the details on the procedures and limitations of these surveys are not readily available from published sources, and since some modifications in analysis were made for this study, a more thorough discussion of this aspect follows.

Mail Surveys

Until 1952, the Fish and Wildlife Service relied on a system of bag checks and postseason contacts for information about waterfowl hunting activity and success for each flyway. Recognizing the serious limitations of this method, the Service initiated an annual Mail Questionnaire Survey of U.S. Waterfowl Hunters in 1952 (Williams 1953). Additional information was needed to increase the reliability of the species composition estimates and to obtain supplementary data on the waterfowl harvest, including age and sex ratios for each species. Therefore, after several years of testing on a smaller scale, the Service initiated, in 1961 and 1962, respectively, its nationwide Duck Wing and Goose Tail Collection Surveys, now known formally as the Cooperative Parts Collection Survey of U.S. Waterfowl Hunters. The development of these mail surveys, collectively referred to as the U.S. Waterfowl Harvest Survey, can be traced in the Service's annual Waterfowl Status Reports, which have been published since these surveys were begun. A complete listing of these reports appears in Part I (Anderson and Henny 1972:95). Full details of survey procedures and limitations are unnecessary here, but the more pertinent points, including modifications accompanying the comprehensive reanalysis of over 20 years of survey data now underway, are summarized in the following sections.

Hunter Questionnaire Survey

Each year's duck stamp purchasers form the population sampled for the Service's Hunter Questionnaire Survey. A random sample of duck stamp sales outlets (primary sampling units) is selected each spring from a master list of the post offices that sell duck stamps. The selected outlets are sent a supply of name and address forms and the postal clerks are instructed to give a form to each duck stamp purchaser (secondary sampling unit) and ask that he fill it out and mail it, thereby placing himself on the Service's mailing list as a potential waterfowl hunter (about 1% of these stamp purchasers have no intention of hunting but are stamp collectors or wish to support waterfowl conservation by buying a stamp and thus do not qualify as potential hunters). At times, experimental seasons requiring permit applications have furnished additional lists of hunters' names and addresses. The distribution of the sample has varied somewhat through the years. In most years there has been some degree of stratification of post offices on the basis of the number of duck stamps sold the previous year, and in recent years, sampling within most States has been further stratified by geographic zones. As a rule, similar proportions of the duck stamp purchasers are sampled in each stratum. Sampling intensity has increased irregularly through the years. The objective during

the 1950's was to obtain estimates reliable enough for management purposes at the flyway level, which required smaller samples than the current objective of obtaining greater reliability at the State level.

In analyzing the survey results, the stratification used in the sampling plan has generally been maintained, except that the data presented here for 1952-1960, when sample sizes were small, are based on a reanalysis at the State level without recognition of either post office or geographic strata. How similar these results would be to those of a stratified analysis depends on how well proportional sampling was achieved (assuming that hunter characteristics differ among strata). Data collected after 1960 were stratified for analysis, usually both geographically and by post office size. Thus, in effect, hunting activity and success after 1960 were estimated for the duck stamp purchasers in each post office group in each geographic area in each State, then summed to form State, flyway, and U.S. totals.

The weaknesses and limitations, known and suspected, of the survey results are numerous. The obvious ones include such things as the voluntary nature of hunter participation in the survey, which necessitates either the assumption that those participating and those refusing to participate have similar characteristics, or some means of measuring and adjusting for any differences between them. In practice, it has been assumed that this nonresponse bias is negligible, but there is some evidence that it results in slight overestimates of hunting activity and success. In the early years of the survey, samples of hunters under 16 years old (junior hunters) were obtained, and the adjustment factors that are now being used to estimate the activity and success of this group were calculated. Additional recent data indicate that these adjustment factors are still valid (Martin 1968).

Certain response bias problems have received much more attention (Atwood 1956, 1959). Respondents tend, for several reasons, to exaggerate their hunting success in reports. Adjustment factors are therefore applied to waterfowl bag estimates. In the early years of the survey, adjustment factors were computed annually for each set of data to which they were applied. With restrictive bag limits for several seasons after 1960, it was felt that the criteria for computing new adjustment factors each year were no longer met, and the factors calculated in 1960 have been used at the flyway level each year since. During the present study, we reviewed the adjustment factors used before 1960 and decided that, in view of our present understanding of this aspect, survey results would be more comparable and understandable if the 1960 adjustment factors were applied to all earlier as well as later data. In another departure from customary procedure, instead of presenting only unadjusted figures at the State level, we have applied the flyway adjustment factor at each level within that flyway. Thus, all harvest figures in this report have been adjusted for response bias. Some accuracy is lost at the State level, but this avoids the confusion that inevitably results when a mixture of adjusted and unadjusted figures is presented. These adjustment factors, together with the junior hunter adjustment factors, have been summarized by Chamberlain et al. (1971:133).

The reliability of the data obtained during the early years of the survey is further limited by the relatively small sample sizes obtained at the State level and the reliance on hunter reports for information about the species composition of the waterfowl harvest. Indications are that hunters, as a group, tend to misidentify certain species and that the size and direction of the bias depends on the species and the region of the country in which the hunters live.

The variances of the survey estimates have not yet been examined in detail, but enough work has been done to provide some general indications. Although important biases are present, sampling error itself, particularly at the flyway level, appears relatively small. For example, approximate values calculated for 1970 duck bag estimates yield 95% confidence limits of ±3% or less at the flyway level and ±1.7% for the entire United States. The effects of the particular stratification system employed have not yet been evaluated statistically, but from what is known about the population being sampled, there is little doubt that stratification has improved the quality of the survey results.

Duck Wing Collection Survey

The sample of waterfowl hunters (primary sampling units) selected to participate in this survey is acquired mainly from the list of hunters cooperating in the Duck Wing Survey the previous season and the

list of successful hunters responding in the Hunter Questionnaire Survey the previous season. When larger samples are desired, these lists are supplemented with lists from other sources, e.g., permit applicants for a special hunting season. Just before the season opens, the hunters are sent a supply of duck wing envelopes and a form for requesting additional envelopes. They are asked to send the Service one wing from each duck (secondary sampling unit) they bag during the season. Coot wings and goose tail feathers are also requested. Space is provided on these envelopes for recording the date, location, and time of day each bird was killed. Biologists examining the wings later, using techniques described by Carney (1964), record the species, age, and sex of each bird.

Much of the analysis of Duck Wing Survey data is tied closely to the analysis of Hunter Questionnaire Survey data. For the comprehensive reanalysis of survey data now underway, each wing received was initially assigned to the duck stamp sales zone to which the sender belonged. The Hunter Questionnaire Survey provided an estimate of the total duck bag for each stamp sales zone, and the wings provided estimates of the species, age, and sex compositions together with the geographic and chronological distributions of the duck bag. Each wing thus represented a specific number of ducks of a particular species, age, and sex bagged at a specific time and place. Attention then shifted from stamp sales zone to location of kill, and these wings, together with the total bag they represented, were regrouped by harvest area. This produced the estimates of bag composition by harvest area contained in this report.

This approach differs from that of previous presentations in two important respects: (1) the use of species, age, and sex composition data for units smaller than States (increased stratification) and (2) the tabulation of harvest estimates by area of kill. In the past, Duck Wing Survey data tabulated by State of kill were applied directly to Hunter Questionnaire Survey data tabulated by State of duck stamp purchase. Thus the earlier procedure contained a source of error that the new one eliminates. (Of course, procedures differ somewhat when the hunter rather than the duck is the sampling unit of interest.)

The Duck Wing Survey is closely allied to the Hunter Questionnaire Survey and is affected by many of the same weaknesses and limitations. However, because of the different objectives and structure of the two surveys, biases affecting one do not necessarily affect the other in the same way, if at all. Furthermore, the two main objectives of the Duck Wing Survey, (1) measuring characteristics of the duck bag in general and of the bag of individual species like the mallard in particular, and (2) measuring hunter characteristics, have different limitations and require different assumptions in analysis.

The voluntary nature of hunter participation in the survey is again a factor. Its effect on the measurements of duck characteristics is probably negligible under most circumstances, but it limits the uses which can be made of the hunter characteristic data. The effects of sampling previously successful hunters rather than the current season's hunters are believed to be quite similar to the effects of voluntary participation.

A factor affecting measurements of both ducks and hunters is that hunters may use up their supply of envelopes early in the season and fail to request more. As species, age, and sex compositons may change with time, having a sample that is skewed toward the early part of the season can be a serious limitation. A major assumption affecting the entire survey is that hunters are not selective in their reports but, as instructed, send a wing from every duck they shoot. This is especially critical as regulations become more species and special-season oriented.

The results of some early comparisons of Duck Wing and Hunter Questionnaire Survey data on species composition and distribution of hunting effort have been published (Geis and Carney 1961) which document some of these problems, and additional information remains unpublished which provides more detail on these and related aspects. Methods of coping with these problems are still being investigated.

As in the Hunter Questionnaire Survey, sampling error appears small. For example, mallard harvest estimates for 1970 had 95% confidence limits of ±4% or less at the flyway level and ±2% for the entire United States. While sampling errors for species, age, and sex composition estimates are small, being functions of sample size, the numerous potential biases continue to raise doubts about the accuracy of many survey results. In other words, while the precision of many of the survey results is unquestionable, their accuracy has not been so firmly established.

Hunter Performance Survey

Initially, this survey was designed primarily to check how accurately hunters participating in the Duck Wing Survey report the time of day they shoot each duck. Secondary objectives included checks on how accurately hunters report their unretrieved kill relative to their total kill in the Hunter Questionnaire Survey, how well the wings mailed by hunters represent their total bag, and how well the distribution of shots fired throughout the day reflects the distribution of the kill. Some of these objectives were met and replaced by others over the years. With the increased use of special hunting regulations in recent years, emphasis shifted more directly to hunter behavior, particularly the ability and willingness of hunters to comply with regulations. Most of the Hunter Performance Survey data presented in this report have appeared previously only in unpublished Fish and Wildlife Service reports, and were made available for use in this report through the courtesy of C. F. Kimball.

In making Hunter Performance Survey observations, the observers, usually employees of State or Federal wildlife agencies, are instructed to watch a hunter or party of hunters without letting them know they are being observed. Since behavior tends to change when people think someone is watching closely, observations of hunters who know they are being observed must be excluded from many of the later analyses. The most reliable information is obtained when the observer follows a complete hunt without the hunters' knowledge and makes a bag check at the end.

This survey lacks many of the advantages of random sampling, suffering particularly from the lack of representativeness typical of small, unstratified samples from large, heterogeneous populations. As a result, a number of potential sources of bias may be noted. For example, the survey tends to over-sample hunting on public shooting areas, under-sample jump shooting and, because most observers have been law enforcement personnel, over-sample law enforcement problem areas. Large areas, including entire States, are often under-sampled or not sampled at all. In addition, observations are usually poorly distributed through the season in relation to the distribution of hunting effort.

There are also other major problems. This survey relies heavily on the skill of its observers for reliable results. Close attention, accurate observation, and sound judgment are necessary for recording details on flights, species, and sexes of waterfowl coming within range of the hunters and determining whether birds not fired on were within range. The observers are highly variable in this regard, and the range in experience becomes greater each year. The jobs of observer and data analyst alike are made even more difficult by the necessity of dealing with hunter parties of different sizes as the primary sampling units. In spite of these limitations, the Hunter Performance Survey provides the only sizable body of data on hunting activity and success that is based on independent observations as opposed to the hunters' own reports.

Discussion

Most of the data in the following sections come from the Service's two large-scale mail surveys, the Hunter Questionnaire Survey and the Duck Wing Survey. In surveys of this type that rely on the memories of cooperators for reports (several weeks to several months after the actual event for the Hunter Questionnaire Survey), the cooperators report what they think happened, or in a few instances, what they want the investigator to think happened. The investigator must then either assume that the report closely approximates what actually happened or make additional studies and, if necessary, develop correction factors. Sometimes, information from independent sources such as the Hunter Performance Survey can be incorporated. In other instances, a new survey technique may replace an old one the way the Duck Wing Survey replaced the species composition section of the Hunter Questionnaire Survey. A permit system for the hunting of all migratory game birds has been proposed which could lead to a number of major improvements in the survey system. Each new phase is, of course, accompanied by its own set of limitations, but the justification for change is that more problems are solved than are created. Although

this 23-year accumulation of data has many limitations that cannot be overlooked, the emphasis in this report from now on will be on discovering and exploiting its strong points.

This report, dealing as it does largely with nationwide surveys, tends to view the results in broad perspective. Probably the most useful results, particularly at the State level, will come when data for smaller units can be thoroughly analyzed. Smith (1975) recently finished this kind of study of Duck Wing Survey data for Wisconsin, and we hope to see other such studies in the future.

SELECTED U.S. HARVEST SURVEY RESULTS: THE ENTIRE WATERFOWL SEASON

The data presented and discussed in this section relate to the entire waterfowl season, defined as including all hunting seasons on ducks, geese, whistling swans *(Cygnus columbianus),* and coots. Data from three special or experimental seasons which were largely mallard-oriented will be examined separately.

Hunter Participation in Waterfowl Hunting

Information on hunter participation, though pertaining to waterfowl hunting in general, also serves as a useful indicator of hunting pressure and changes therein for the most heavily hunted species. The Hunter Questionnaire Survey measures hunter participation in terms of active hunters and hunter-days. Duck stamp purchasers who hunt waterfowl at least once during a season are termed "active adult waterfowl hunters" or simply "active hunters." Estimated numbers of these active hunters and the percentages they represent of all duck stamp purchasers are summarized by year and flyway in Table 4. Hunters under 16 years old who hunted without a duck stamp (junior hunters) amount to an additional 5 to 15%, depending on the State, and are not included in these estimates.

A "hunter-day" is defined as the period of time an active hunter spends hunting on any calendar day he is afield regardless of the duration of his hunt. The average number of hunter-days each potential adult waterfowl hunter was afield and the total number of hunter-days accrued by waterfowl hunters of all ages are summarized by year and flyway in Table 5.

Questionnaire Survey data, together with duck stamp sales figures, thus provide five indicators of hunting pressure. Listed in order from that showing the narrowest range of fluctuation to that showing the widest, they are (1) active hunters per potential hunter, in percent, (2) hunter-days per potential hunter, (3) duck stamps sold, (4) number of active hunters, and (5) total hunter-days. This is also the order of increasing usefulness as indicators of changes in hunting pressure. The estimate of total hunter-days, since it contains elements of each of the other four indicators, is the most sensitive and useful of the five.

Based on total hunter-days (Table 5), hunting pressure was comparatively stable from 1952 through 1958 with a peak in 1957, then dropped sharply in 1959 and again in 1961, reaching its lowest point in 1962. Thereafter, it increased fairly steadily with just one reversal in 1968, finally returning to the level of the 1950's in 1969. It reached its highest level in 1970, the year in which average hunter-days also reached its highest level (Table 5) and duck stamp sales had their second biggest year (Fig. 1).

Characteristics of the Mallard Harvest

The characteristics of the mallard harvest emphasized in this section include (1) its size (both relative and absolute), (2) its age and sex compositions, (3) changes in each of these factors from period to period, month to month, and year to year, and (4) differences from harvest area to harvest area, State to State, and flyway to flyway. Initial plans for this report were for the analysis of mallard harvest data accumulated through 1970, but data for the 1971-1974 seasons are now available in comparable detail and have therefore been included. However, emphasis remains on the earlier period in much of the discussion that follows.

Table 4. Active hunters: Summary of annual estimates of percentages of duck stamp purchasers intending to hunt waterfowl (potential adult waterfowl hunters) who actually did so and of total numbers of these active adult waterfowl hunters, by flyway, 1952-1974.

Hunting season	Alaska		Pacific Flyway		Central Flyway		Mississippi Flyway		Atlantic Flyway		Entire United States			
											Excluding Alaska		Including Alaska	
	Percent active	Number active	Percent active	Number active	Percent active	Number active	Percent active	Number active	Percent active	Number active	Percent active	Number active	Percent active	Number active
1952-53	74.5	6,200	89.6	418,300	86.7	435,700	88.1	865,500	87.7	270,500	88.1	1,990,100	88.0	1,996,300
1953-54	68.0	6,800	86.2	385,500	84.7	431,400	87.7	823,700	85.1	287,000	86.3	1,927,700	86.2	1,934,500
1954-55	79.7	8,500	86.7	359,400	85.9	408,600	87.6	802,100	86.7	294,900	86.9	1,865,000	86.9	1,873,600
1955-56	82.8	8,000	83.6	348,100	85.3	443,100	86.9	880,100	84.0	320,800	85.5	1,992,200	85.5	2,000,200
1956-57	Not in survey		81.5	340,400	85.9	421,800	85.8	871,000	83.2	312,300	84.6	1,945,400	Alaska not in survey	
1957-58			86.0	358,000	87.7	485,500	87.9	878,300	84.9	299,800	87.0	2,021,600		
1958-59			84.8	327,000	84.2	421,100	88.4	822,100	85.4	275,000	86.3	1,845,200		
1959-60			83.9	249,300	80.9	295,500	87.0	606,000	84.0	199,500	84.6	1,350,300		
1960-61			81.0	254,600	76.6	292,900	81.5	603,500	77.0	198,000	79.6	1,348,900		
1961-62			79.6	232,000	73.8	199,300	81.6	426,800	76.0	174,100	78.6	1,032,200		
1962-63			78.2	229,500	74.5	137,600	80.8	329,800	76.3	178,300	78.3	875,200		
1963-64			79.6	257,000	76.1	198,500	81.1	460,200	73.5	196,000	78.4	1,111,600		
1964-65			80.8	260,700	80.2	224,100	84.6	558,200	77.7	218,300	81.8	1,261,300		
1965-66	66.4	6,200	82.5	280,800	80.4	207,800	87.2	546,900	80.9	240,300	83.8	1,275,800	83.7	1,282,000
1966-67	63.6	6,700	82.4	309,500	84.0	258,600	87.6	657,200	81.7	269,900	84.8	1,495,200	84.6	1,501,900
1967-68	72.4	7,300	84.2	318,700	84.7	303,100	87.3	704,800	80.8	287,900	85.0	1,614,500	84.9	1,621,900
1968-69	72.5	8,900	85.0	332,500	80.1	257,500	86.6	611,200	80.5	304,200	83.8	1,505,300	83.7	1,514,200
1969-70	69.2	9,100	84.0	356,100	84.4	313,700	87.0	698,900	83.5	360,800	85.1	1,729,400	85.0	1,738,500
1970-71	66.3	8,500	83.2	378,000	84.7	368,800	86.5	864,400	82.9	405,300	84.8	2,016,500	84.7	2,025,000
1971-72	69.7	9,900	82.6	357,100	82.7	372,900	85.2	847,500	82.6	406,800	83.7	1,984,300	83.6	1,994,200
1972-73	72.6	10,700	84.3	323,100	83.4	351,800	86.1	761,600	83.5	358,400	84.7	1,794,900	84.6	1,805,600
1973-74	72.8	12,300	83.3	318,700	82.8	338,200	85.6	700,000	84.3	357,700	84.3	1,714,600	84.2	1,726,900
1974-75	64.6	10,200	84.2	324,700	82.3	346,600	87.0	764,000	84.3	368,000	85.0	1,803,300	84.8	1,813,500

Table 5. Hunter-days: Summary of annual estimates of average (per potential adult waterfowl hunter) and total (by waterfowl hunters of all ages) numbers of waterfowl hunter-days of recreation accrued, by flyway, 1952-1974.

Hunting season	Alaska		Pacific Flyway		Central Flyway		Mississippi Flyway		Atlantic Flyway		Entire United States			
											Excluding Alaska		Including Alaska	
	Average	Total	Average	Total	Average	Total	Average	Total	Average	Total	Average	Total	Average	Total
1952-53	4.18	37,500	5.85	2,971,200	5.54	3,022,700	5.29	5,557,700	4.91	1,591,800	5.41	13,143,400	5.40	13,180,900
1953-54	3.42	37,100	5.89	2,866,600	5.51	3,046,800	5.83	5,862,200	4.83	1,712,900	5.62	13,488,500	5.61	13,525,500
1954-55	3.92	45,600	6.17	2,781,900	5.86	3,027,900	5.98	5,856,900	5.15	1,843,000	5.86	13,509,700	5.85	13,555,300
1955-56	3.48	36,700	5.66	2,562,600	5.98	3,369,300	5.66	6,133,100	5.25	2,106,700	5.66	14,171,800	5.65	14,208,500
1956-57	Not in survey		5.38	2,446,000	5.80	3,091,600	5.84	6,346,900	5.11	2,019,600	5.63	13,904,100	Alaska not in survey	
1957-58			6.34	2,871,500	6.36	3,824,800	6.86	7,339,300	5.36	1,988,100	6.42	16,023,700		
1958-59			6.05	2,535,300	5.77	3,133,400	6.24	6,209,600	4.97	1,683,600	5.90	13,561,800		
1959-60			5.65	1,825,600	4.64	1,842,500	5.45	4,060,700	4.69	1,172,300	5.19	8,901,200		
1960-61			5.15	1,757,900	4.62	1,917,600	5.32	4,217,900	4.42	1,194,500	4.99	9,087,800		
1961-62			4.87	1,543,700	4.39	1,286,300	4.62	2,585,900	4.58	1,104,100	4.62	6,520,000		
1962-63			5.56	1,784,600	4.87	978,800	4.91	2,156,500	4.70	1,164,900	5.03	6,084,800		
1963-64			5.86	2,058,600	5.01	1,419,000	5.16	3,134,500	4.47	1,254,000	5.16	7,866,100		
1964-65			5.81	2,036,800	5.40	1,635,900	5.73	4,045,800	5.04	1,489,100	5.56	9,207,600		
1965-66	4.22	42,900	5.63	2,083,800	5.29	1,483,100	6.19	4,151,800	4.92	1,535,100	5.66	9,253,900	5.65	9,296,800
1966-67	3.21	36,600	5.96	2,433,800	6.66	2,227,300	6.29	5,048,100	5.21	1,811,100	6.08	11,520,300	6.07	11,556,900
1967-68	4.78	52,600	6.34	2,608,100	6.22	2,419,500	6.15	5,314,000	5.09	1,906,600	6.00	12,248,200	6.00	12,300,800
1968-69	4.07	54,500	5.85	2,485,200	5.06	1,764,500	5.42	4,094,000	5.00	1,988,300	5.36	10,332,000	5.35	10,386,500
1969-70	3.52	50,200	6.72	3,096,600	6.47	2,610,000	6.26	5,382,100	5.75	2,613,900	6.29	13,702,700	6.27	13,752,900
1970-71	3.87	54,000	6.73	3,323,900	6.88	3,250,800	7.05	7,531,900	5.65	2,904,700	6.67	17,011,200	6.65	17,065,300
1971-72	4.59	71,100	6.59	3,097,100	6.85	3,354,200	6.74	7,172,700	5.69	2,945,800	6.52	16,569,800	6.50	16,641,000
1972-73	4.39	70,200	6.89	2,871,500	6.67	3,052,700	6.90	6,532,200	5.88	2,657,400	6.65	15,113,800	6.63	15,184,100
1973-74	4.69	86,100	7.05	2,932,100	6.58	2,916,800	6.75	5,907,600	5.96	2,658,900	6.61	14,415,400	6.59	14,501,500
1974-75	3.20	55,100	6.94	2,908,900	6.41	2,931,800	7.03	6,606,400	6.18	2,835,700	6.71	15,282,800	6.69	15,337,900

Numbers and Percentages of Certain Species in the Harvest

Both the Hunter Questionnaire and Duck Wing Surveys provide data on species composition but the two do not necessarily agree. Although only a part of the information in the files has been examined, preliminary indications are that wing receipts produce somewhat lower estimates of the incidence of mallards in the bag than do questionnaire reports, but reliable figures on the amount of the difference are not available. As noted earlier, neither source of information is bias-free. The correct answer is probably intermediate between the two. In the data examined thus far (Mississippi Flyway for 1959 [Geis and Carney 1961]; Atlantic and Mississippi Flyways for 1960), this difference between survey results for mallards was most pronounced in the Atlantic Flyway. On the other hand, wing receipts showed a higher incidence of black ducks in both flyways than did questionnaire reports. Although a questionnaire form mixup also affected the black duck figures to some extent, the indication is that hunters tended to overreport mallards and underreport black ducks in the bag. This is apparently because of misidentification, but chronological biases in the wing survey may be a contributing factor. The consequences of such survey differences must be kept in mind, especially when the periods of interest involve both pre-1961 and more recent data.

Mallards—The mallard wings received in the Duck Wing Survey are segregated into those that appear to be from normal wild birds and those from birds of other bloodlines (excluding hybrids). The latter, termed "abnormal" in this study, are those that can be indentified from wing characteristics as members of that group referred to as "game farm," "hand reared," or "domestic" mallards. However, relatively few such birds are identifiable, considering the large numbers, most of them immature birds, released in recent years in certain areas such as Pennsylvania and Maryland, and it is not practical to maintain the distinction throughout this report. Annual estimates of relative numbers of normal and abnormal mallards harvested are summarized in Table A-8 by flyway and in Table A-9 for the seven States in which the harvest of abnormal mallards is numerically the largest. In all other tables and in the discussion, the term "mallard" refers to all bloodlines, normal and abnormal, combined.

Estimates of the total annual mallard harvest and its percentage of the total duck harvest are shown by State for 1952-1974 (Table A-10) and by harvest area and State for 1960-1974 (Table A-11). Annual flyway-level and nationwide estimates of both totals and percentages are summarized in Table 6. The relative importance of the mallard in the duck harvest and the average size of the mallard harvest in various parts of the United States are portrayed geographically by harvest area in Figs. 3 and 4, respectively, based on overall harvest figures for 1961 through 1970 (the first 10 years of the nationwide Duck Wing Survey).

Except in the Pacific Flyway, the percentage of the total duck bag consisting of mallards has been noticeably lower since the basis of the estimates was changed in 1961. In general, the total mallard bag was variable but rather high during most of the 1950's; dropped sharply in 1959 and decreased further in the early 1960's; and then, except for rather pronounced reverses in 1965 and 1968, gradually returned to its earlier high levels by 1970. This U.S. trend, although dominated by the large mallard bag in the Mississippi Flyway, particularly during the 1950's, has been reflected in each of the other flyways as well. The small mallard bag in the Atlantic Flyway has been less subject to sudden change than the mallard bag in the other flyways, but the same general trend is evident.

The distribution of the mallard bag among flyways appears to have undergone a marked shift between 1952-1961 and 1962-1974. During the earlier period, the mallard harvests in the Pacific and Central Flyways each made up about 24% of the U.S. total. In the latter period, about 31% were taken in the Pacific Flyway and only 20% in the Central Flyway. Concurrently, the mallard bag decreased from 47 to 42% in the Mississippi Flyway and increased from 5 to 7% in the Atlantic Flyway. The decreases in the Central and Mississippi Flyways coincide with the special restrictions on mallard hunting in effect since 1962 (Table 1), primarily in these two flyways. Looking briefly at this community of harvest areas, when frequency distributions were plotted for area size, percentage of mallards in the duck bag, total annual mallard bag, and total annual mallard bag per

Table 6. Summary, by flyway, of annual bias-adjusted estimates of percentages of the total duck bag composed of mallards and total numbers of mallards bagged, 1952-1974. (All mallard bloodlines and all U. S. waterfowl seasons included.)

Hunting season	Alaska		Pacific Flyway		Central Flyway		Mississippi Flyway		Atlantic Flyway		Entire United States: Excluding Alaska		Entire United States: Including Alaska	
	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number
1952-53	33.4	19,900	33.5	1,578,600	53.2	1,653,800	50.9	2,626,000	17.0	231,800	42.4	6,090,300	42.4	6,110,200
1953-54	36.7	20,800	32.3	1,402,100	42.4	1,284,900	42.6	1,948,200	21.0	270,800	37.1	4,906,000	37.0	4,926,700
1954-55	41.4	24,800	34.6	1,305,400	48.4	1,115,300	51.5	2,135,500	20.1	265,300	41.8	4,821,400	41.8	4,846,300
1955-56	57.5	26,500	35.0	1,392,300	52.1	1,581,800	57.8	3,089,600	20.3	355,000	45.5	6,418,700	45.5	6,445,200
1956-57		↑	31.6	1,137,300	45.9	1,377,200	60.2	3,044,700	21.2	314,900	44.7	5,874,100		↑
1957-58			32.7	1,425,000	45.1	1,729,000	59.9	3,422,000	19.9	296,900	44.6	6,872,900		
1958-59			31.1	1,331,100	45.8	1,202,400	62.2	2,945,400	19.3	248,300	44.3	5,727,200		
1959-60			35.0	762,700	48.2	633,900	46.3	1,270,900	18.3	128,700	40.3	2,796,200		
1960-61 a/b/			29.8	747,600	49.8	722,400	51.8	1,621,800	14.6	126,400	40.4	3,218,200		
1961-62			35.0	723,000	51.9	409,400	49.7	867,500	14.6	107,400	39.5	2,107,300		
1962-63			33.4	650,400	44.6	190,800	38.9	439,300	15.9	117,700	32.9	1,398,200		
1963-64			33.4	945,900	40.8	413,300	37.1	930,500	15.5	140,400	33.5	2,430,200		
1964-65			38.1	963,900	39.4	520,100	37.4	1,323,200	16.5	164,300	35.5	2,971,600		
1965-66		↓	35.4	1,031,200	27.4	333,600	25.5	924,400	16.1	163,900	28.0	2,453,100		↓
1966-67	25.4	12,400	33.4	1,176,000	32.9	702,600	33.7	1,653,700	15.8	224,600	31.4	3,756,800	31.3	3,769,200
1967-68	29.8	19,500	31.9	1,394,500	36.6	819,600	36.4	1,737,000	17.4	233,900	32.9	4,185,000	32.9	4,204,600
1968-69	24.6	17,000	33.5	1,013,000	45.1	557,300	35.0	834,300	19.2	264,000	33.3	2,668,600	33.2	2,685,600
1969-70	28.4	12,400	28.9	1,175,900	31.3	813,900	31.9	1,433,900	18.5	334,100	29.0	3,757,800	29.0	3,770,200
1970-71	32.5	20,000	30.3	1,339,000	35.7	1,068,300	39.3	2,534,600	18.2	361,900	33.5	5,303,700	33.4	5,323,800
1971-72	33.3	22,600	31.8	1,266,100	44.1	1,232,300	40.3	2,169,500	20.0	345,300	36.1	5,013,100	36.1	5,035,800
1972-73	26.6	24,600	34.0	1,315,100	42.4	1,256,700	39.1	1,956,500	22.2	365,800	36.3	4,894,100	36.2	4,918,700
1973-74	28.0	23,500	35.8	1,153,600	41.2	1,007,300	36.9	1,696,300	22.2	343,800	35.6	4,200,900	35.5	4,224,400
1974-75	28.4	15,300	32.5	1,170,500	36.5	809,500	43.3	2,253,000	22.7	393,600	36.3	4,626,600	36.3	4,641,900

Not in survey — Alaska not in survey

a/ Estimates based solely on questionnaire data until 1961 in Pacific and Central Flyways and Alaska, until 1960 elsewhere; subsequent estimates based on both questionnarire and wing survey data.
b/ Estimates summarized by State of duck stamp purchase through 1960; by State of kill beginning with 1961.

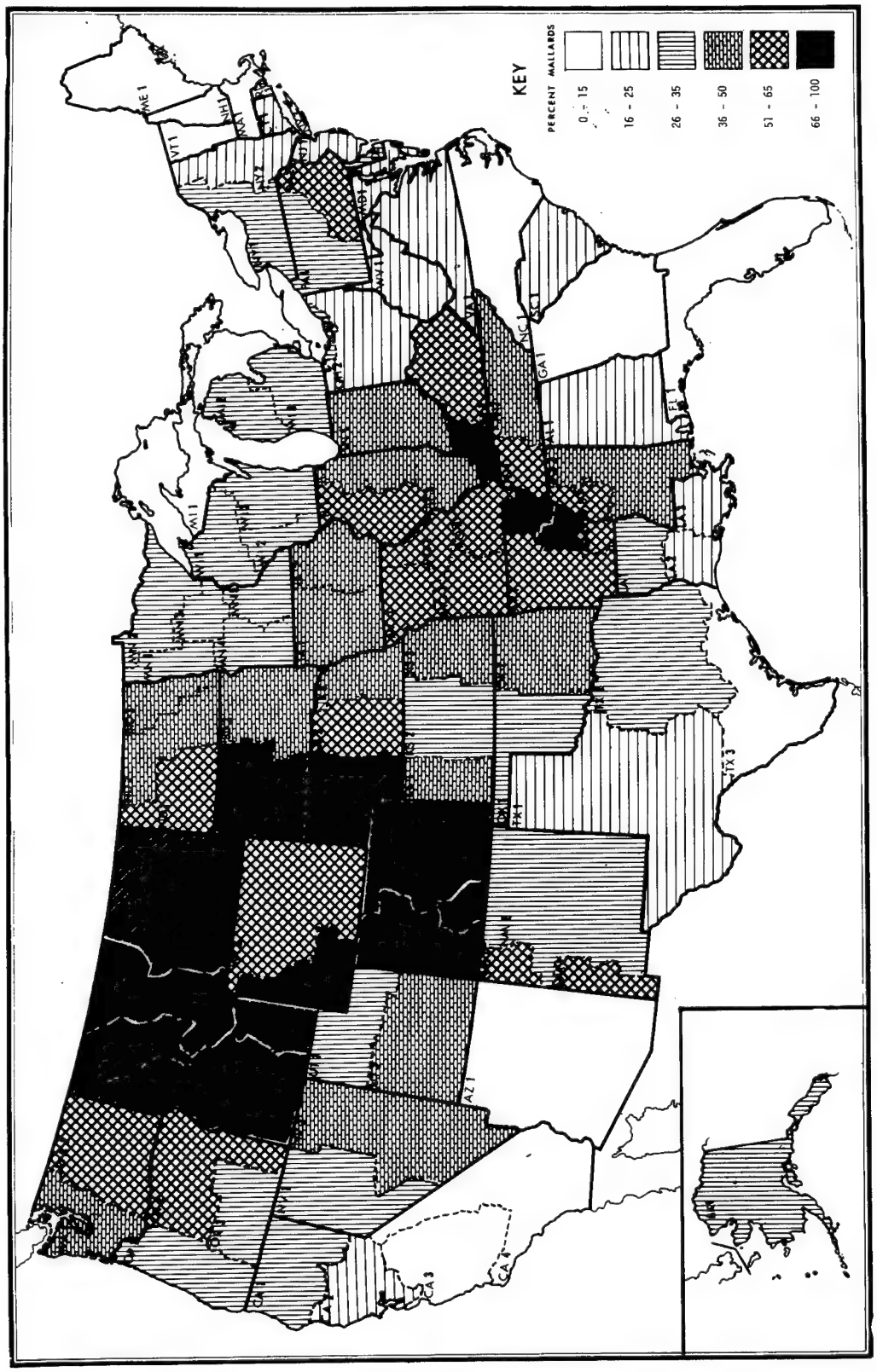


Fig. 3.—Geographic distribution of selected characteristics of the U.S. mallard harvest by harvest area: Overall percentage, by frequency class, of the total duck bag made up of mallards, 1961-1970.

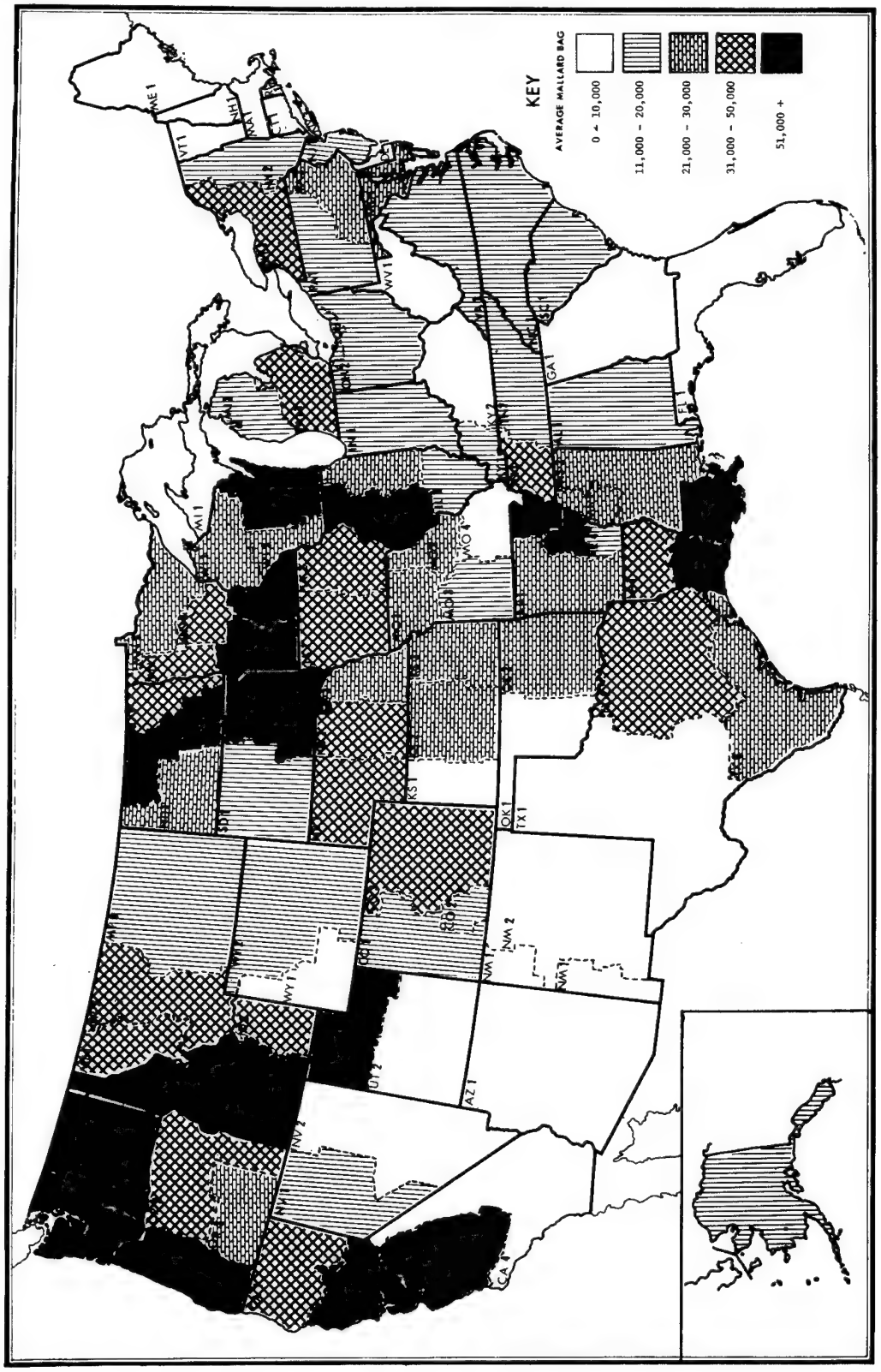


Fig. 4.—Geographic distribution of selected characteristics of the U.S. mallard harvest by harvest area: Average annual mallard bag, by frequency class, 1961-1970.

square mile (per 2.59 km^2), the curve reached its peak in the lower one-third of the range in every case. Mallards made up 2.0 to 82.5% of the harvest, averaging 32.5%. The total mallard bag was extremely skewed whether measured on a per-harvest-area basis (low = 1,100; high = 185,000; average = 31,200) or on a per-square-mile basis (low = 0.03; high = 12.73; average = 0.88). Estimates of numbers of potential hunters are not available by harvest area, but at the State level their frequency distribution and that of average mallard bag per potential hunter also had peaks skewed far toward the low end of their ranges. It is apparent that manipulations entailing the assumption that these data are normally distributed are to some degree suspect and conclusions based on statistical evidence alone should be treated accordingly.

Other selected species —Included here are those ducks that hunters most often confuse with the mallard and that should accordingly be considered when attention turns to hunting regulations for the mallard. Some are so similar that Delacour (1959) regards them as subspecies of the mallard. Of these, the black duck is the most important. Annual black duck harvest estimates are summarized by flyway for 1952-1974 in Table A-12. As mentioned, black duck figures based on hunter reports of species composition (those before 1960 for this species) tend to be underestimates.

Estimates for three other mallard-like ducks, the mottled duck *(Anas fulvigula)*, the Mexican duck, and mallard x black duck hybrids, are available for the years of the Duck Wing Survey (Table A-13). Estimates for mallard x black duck hybrids are low, as not all such birds can be distinguished from their parents by wing characteristics. The other two species are mainly of local importance; mottled ducks are taken primarily in Texas, Louisiana, and Florida, and small numbers of Mexican ducks are taken in Arizona and New Mexico. Some Mexican ducks are taken in western Texas as well, but are not recorded as such in survey records until 1973. Furthermore, wing identification of this species and of mallard x Mexican duck hybrids is difficult, and as such hybrids are apparently quite common, substantial numbers may have been recorded as Mexican ducks.

Age and Sex Compositions of the Mallard Harvest

Although Duck Wing Survey data on species, age, and sex compositions for the Mississippi Flyway were first obtained during the 1959-60 season (Geis and Carney 1961), the earliest figures considered reliable enough for use in this study are the 1960-61 season estimates for the Atlantic and Mississippi Flyways (Table A-11). These estimates are available only by State of duck stamp purchase and not by harvest area or State of kill, a distinction which probably has a negligible effect on the results at State and flyway levels. Annual estimates of the total numbers of mallards of each age and sex bagged and their age and sex ratios are presented by harvest area in Table A-11 for 1961-1974 together with the 1960 figures described above. This information is summarized by flyway and for the entire United States in Table 7. The overall age and sex ratios of mallards harvested during the period 1961-1970 in various parts of the United States are portrayed geographically in Figs. 5, 6, and 7.

Generally, the age ratios (numbers of immature birds per adult) tend to show alternate increases and decreases in consecutive years. (A test for this at the flyway level yielded $\chi^2 = 4.45$, $P < 0.05$, 1 df) This tendency to follow a 2-year cycle indicates that production one year is not independent of production the previous year. This is reasonable because the population returning to the breeding grounds the year after a season of poor production will consist largely of adults with the experience of at least one breeding season behind them. Under comparable habitat conditions, such a population would be expected to produce more young per pair than the population after a productive season, which would contain many young, inexperienced birds. Of course, the mallard is just one of many species to which this logic applies. Other factors affecting the age ratio in the fall population, particularly the apparent influence of breeding population size, density, and distribution on reproductive success, have been discussed in detail by Pospahala et al. (1974).

In contrast, sex ratios (males per female) appear to vary randomly in the harvest from year to year (except for the higher ratios obtained in the Central Flyway in association with point-limit regulations).

Table 7. Summary, by flyway, of annual bias-adjusted mallard bag estimates by sex (M = male, F = female) and age together with corresponding sex and age ratios, 1960-1974. (All mallard bloodlines and all U. S. waterfowl seasons included.)

Hunting season		Alaska		Pacific Flyway		Central Flyway		Mississippi Flyway		Atlantic Flyway		Entire United States: Excluding Alaska		Entire United States: Including Alaska	
		Immature	Adult	Immature	Adult	Immature	Adult	Immature	Adult	Immature	Adult	Immature	Adult	Immature	Adult
1960-61	M bagged	Not in survey						538,000	346,400	50,100	20,000	Survey data incomplete			
	F bagged							496,300	241,100	41,900	14,400				
	Sex ratios							1.08	1.44	1.20	1.38				
	Age ratio							1.76		2.67					
1961-62	M bagged			233,200	220,700	98,000	176,500	253,100	263,200	38,600	22,000	623,000	682,400		
	F bagged			164,500	104,700	59,700	75,200	200,200	150,900	32,000	14,700	456,400	345,600		
	Sex ratios			1.42	2.11	1.64	2.35	1.26	1.74	1.20	1.49	1.37	1.97		
	Age ratio			1.22		0.63		1.09		1.92		1.05			
1962-63	M bagged			190,500	191,200	52,700	72,600	141,100	111,300	39,400	28,100	423,700	403,200		
	F bagged			172,100	96,600	38,300	27,100	119,800	67,100	31,900	18,300	362,100	209,200		
	Sex ratios			1.11	1.98	1.37	2.68	1.18	1.66	1.24	1.54	1.17	1.93		
	Age ratio			1.26		0.91		1.46		1.54		1.28			
1963-64	M bagged			311,400	246,000	117,600	148,700	285,900	237,700	46,200	32,400	761,000	664,800		
	F bagged			269,000	119,500	81,300	65,700	248,100	158,800	41,100	20,800	639,500	364,900		
	Sex ratios			1.16	2.06	1.45	2.26	1.15	1.50	1.12	1.55	1.19	1.82		
	Age ratio			1.59		0.93		1.35		1.64		1.36			
1964-65	M bagged			282,500	289,400	123,700	220,500	388,300	409,200	53,900	36,100	848,400	955,200		
	F bagged			246,500	145,600	83,100	92,800	324,800	200,900	51,000	23,400	705,300	462,700		
	Sex ratios			1.15	1.99	1.49	2.38	1.20	2.04	1.06	1.55	1.20	2.06		
	Age ratio			1.22		0.66		1.17		1.76		1.10			
1965-66	M bagged			377,500	240,400	92,900	122,600	315,800	240,000	54,200	35,700	840,400	638,600		
	F bagged			295,100	118,300	68,600	49,400	256,300	112,300	51,500	22,600	671,500	302,600		
	Sex ratios			1.28	2.03	1.35	2.48	1.23	2.14	1.05	1.58	1.25	2.11		
	Age ratio			1.88		0.94		1.62		1.81		1.61			
1966-67	M bagged	6,400	200	395,000	292,500	201,900	246,700	528,100	420,600	73,100	51,400	1,198,100	1,011,200	1,204,400	1,011,400
	F bagged	5,200	600	316,100	172,400	141,700	112,300	461,900	243,100	68,900	31,200	988,600	559,000	993,800	559,500
	Sex ratios	1.23	0.43	1.25	1.70	1.42	2.20	1.14	1.73	1.06	1.65	1.21	1.81	1.21	1.81
	Age ratio	14.31		1.53		0.96		1.49		1.72		1.39		1.40	
1967-68	M bagged	7,800	1,800	471,600	336,000	231,800	311,600	566,900	443,900	77,000	47,500	1,347,300	1,139,000	1,355,100	1,140,800
	F bagged	8,100	1,800	412,500	174,400	153,900	122,300	467,600	258,600	76,000	33,400	1,109,900	588,800	1,118,100	590,600
	Sex ratios	0.97	1.01	1.14	1.93	1.51	2.55	1.21	1.72	1.01	1.42	1.21	1.93	1.21	1.93
	Age ratio	4.50		1.73		0.89		1.47		1.89		1.42		1.43	
1968-69	M bagged	7,800	2,000	296,600	323,100	114,900	283,500	243,600	267,700	92,200	53,700	747,300	928,100	755,100	930,100
	F bagged	5,700	1,500	218,700	174,500	65,000	93,900	194,200	128,800	86,600	31,500	564,500	428,700	570,200	430,100
	Sex ratios	1.37	1.35	1.36	1.85	1.77	3.02	1.25	2.08	1.06	1.71	1.32	2.17	1.32	2.16
	Age ratio	3.91		1.04		0.48		1.10		2.10		0.97		0.97	
1969-70	M bagged	4,700	1,400	432,500	254,300	260,500	310,100	518,900	332,500	107,700	77,400	1,319,600	974,400	1,324,400	975,800
	F bagged	5,400	900	353,100	136,000	149,500	93,700	405,500	176,900	98,500	50,500	1,006,500	457,200	1,012,000	458,100
	Sex ratios	0.87	1.51	1.22	1.87	1.74	3.31	1.28	1.88	1.09	1.53	1.31	2.13	1.31	2.13
	Age ratio	4.49		2.01		1.02		1.81		1.61		1.62		1.63	
1970-71	M bagged	7,600	3,500	443,500	354,400	284,900	474,200	790,100	768,500	129,600	76,600	1,648,200	1,673,700	1,655,800	1,677,300
	F bagged	6,200	2,700	350,400	190,600	168,700	140,600	588,700	387,200	107,000	48,600	1,214,900	766,900	1,221,100	769,600
	Sex ratios	1.23	1.29	1.27	1.86	1.69	3.37	1.34	1.98	1.21	1.58	1.36	2.18	1.36	2.18
	Age ratio	2.20		1.46		0.74		1.19		1.89		1.17		1.18	
10-year average (5 with Alaska)	M bagged	6,900	1,800	343,400	274,800	157,900	236,700	403,200	349,500	71,200	46,100	975,700	907,100	1,259,000	1,147,100
	F bagged	6,100	1,500	279,800	143,300	101,000	87,300	326,700	188,500	64,400	29,500	771,900	448,500	983,000	561,600
	Sex ratios	1.12	1.20	1.23	1.92	1.56	2.71	1.23	1.85	1.10	1.56	1.26	2.02	1.28	2.04
	Age ratio	3.98		1.49		0.80		1.36		1.79		1.29		1.31	
1971-72	M bagged	6,700	3,600	408,200	328,000	361,400	527,100	599,900	724,500	102,300	88,500	1,471,800	1,668,200	1,478,500	1,671,700
	F bagged	9,800	2,500	339,000	190,900	189,300	154,400	479,700	365,500	102,800	51,600	1,110,800	762,400	1,120,600	764,900
	Sex ratios	0.68	1.41	1.20	1.72	1.91	3.41	1.25	1.98	1.00	1.71	1.32	2.19	1.32	2.19
	Age ratio	2.72		1.44		0.81		0.99		1.46		1.06		1.07	
1972-73	M bagged	10,100	2,800	391,600	418,500	307,700	635,400	523,900	680,800	121,700	84,500	1,344,900	1,819,300	1,355,000	1,822,100
	F bagged	9,200	2,500	296,400	208,600	153,100	160,500	432,400	319,400	102,500	57,000	984,400	745,500	993,600	748,000
	Sex ratios	1.10	1.11	1.32	2.01	2.01	3.96	1.21	2.13	1.19	1.48	1.37	2.44	1.36	2.44
	Age ratio	3.65		1.10		0.58		0.96		1.58		0.91		0.91	
1973-74	M bagged	11,000	1,200	336,200	354,100	264,900	467,200	551,600	518,500	122,700	62,700	1,275,400	1,402,500	1,286,400	1,403,800
	F bagged	10,000	1,300	276,200	187,000	140,700	134,400	412,800	213,400	111,600	46,800	941,400	581,600	951,300	582,900
	Sex ratios	1.10	0.94	1.22	1.89	1.88	3.48	1.34	2.43	1.10	1.34	1.35	2.41	1.35	2.41
	Age ratio	8.35		1.13		0.67		1.32		2.14		1.12		1.13	
1974-75	M bagged	6,300	2,200	414,500	263,700	282,300	291,400	843,200	545,000	145,900	78,200	1,685,900	1,178,300	1,692,300	1,180,500
	F bagged	5,300	1,500	351,800	140,500	157,400	78,300	638,600	226,200	121,000	48,500	1,268,800	493,500	1,274,100	495,000
	Sex ratios	1.21	1.45	1.18	1.88	1.79	3.72	1.32	2.41	1.21	1.61	1.33	2.39	1.33	2.38
	Age ratio	3.16		1.90		1.19		1.92		2.11		1.77		1.77	

Alaska not in survey

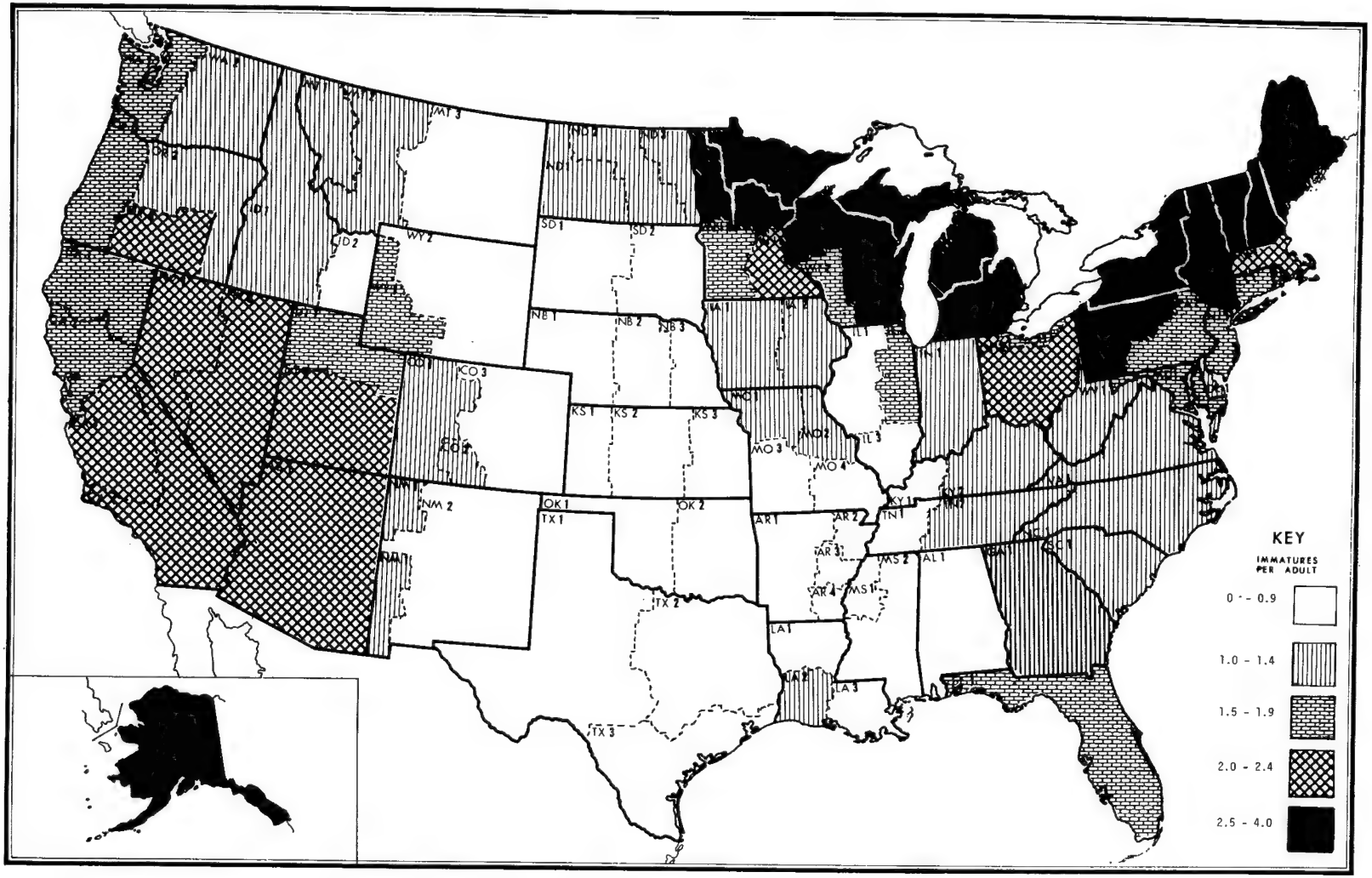


Fig. 5.—Geographic distribution of selected characteristics of the U.S. mallard harvest by harvest area: Overall age ratios of mallards bagged, by frequency class, 1961-1970.

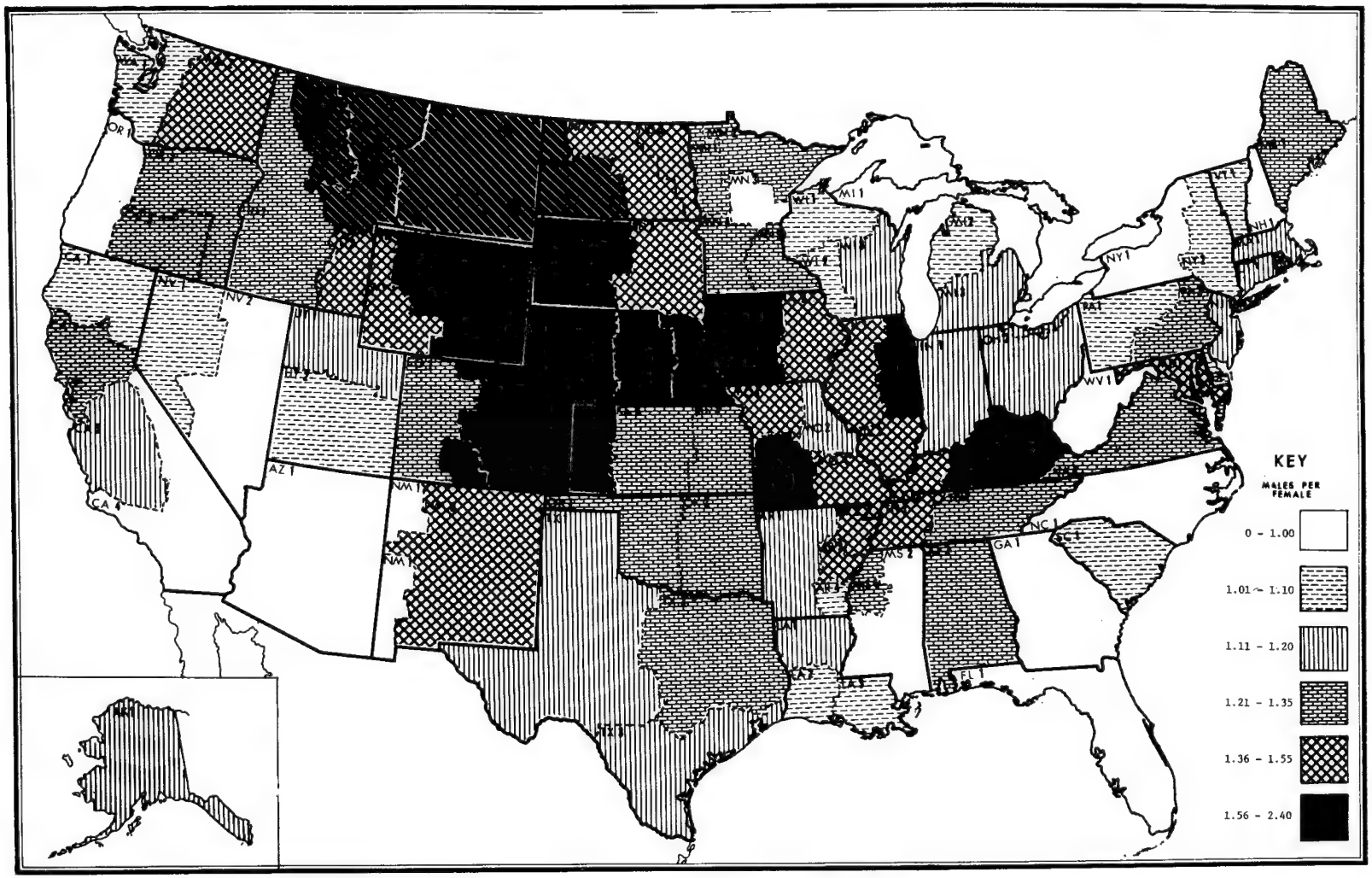


Fig. 6.—Geographic distribution of selected characteristics of the U.S. mallard harvest by harvest area: Overall sex ratios of immature mallards bagged, by frequency class, 1961-1970.

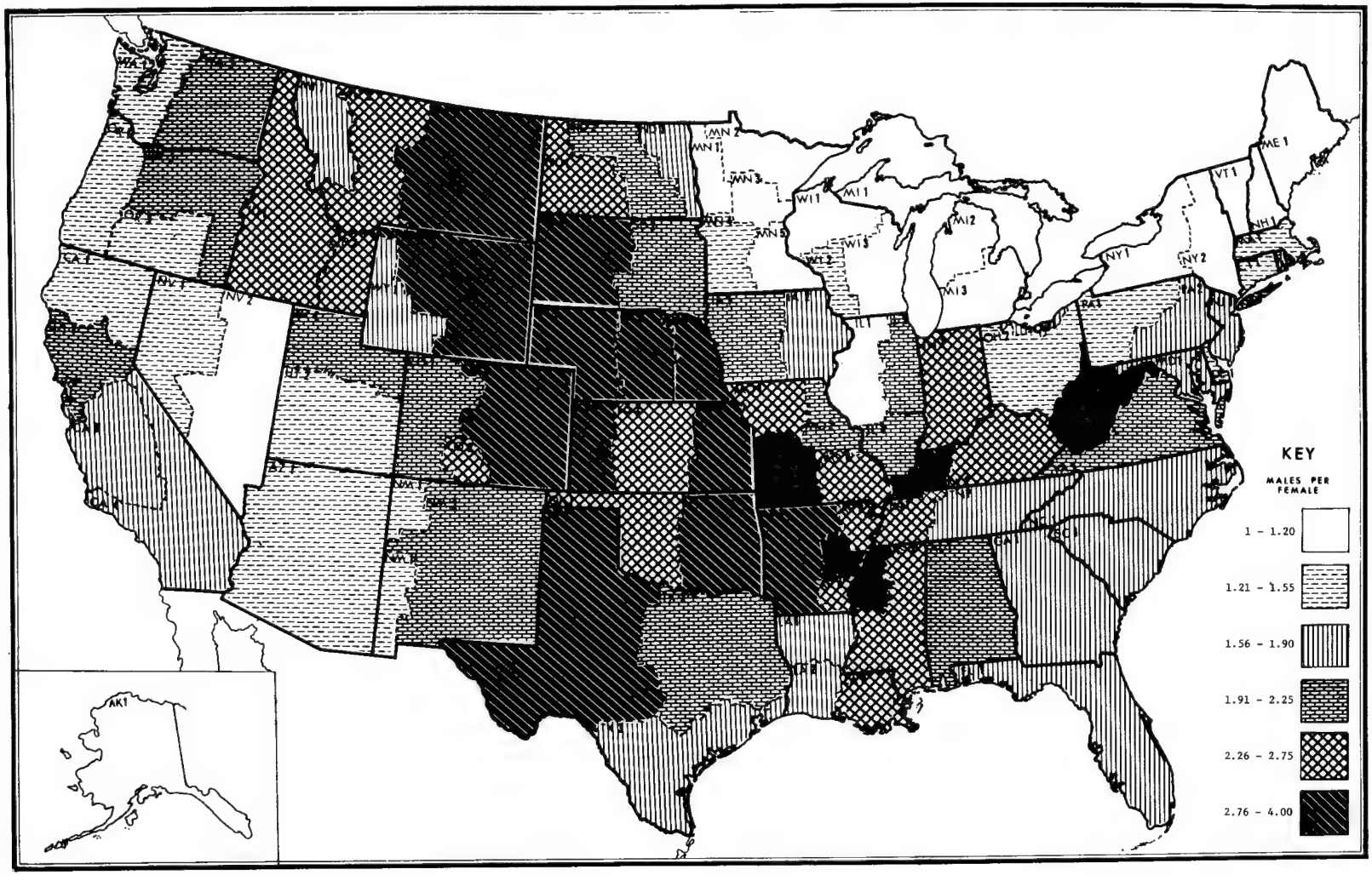


Fig. 7.—Geographic distribution of selected characteristics of the U.S. mallard harvest by harvest area: Overall sex ratios of adult mallards bagged, by frequency class, 1961-1970.

Young birds are believed to enter the population and their first hunting season with a sex ratio of about 1:1, resulting in a rather narrow range of sex ratios for immature birds in the harvest. Sex ratios of adults are consistently greater than 1:1 in the population and a great deal more variable than among immature birds, and these characteristics are clearly reflected in the harvest. Interestingly, an analysis of harvest area averages for 1961-1970 showed sex ratios of the adults and immatures in the harvest to be significantly correlated ($r = 0.67$, $P < 0.001$).

The age and sex ratios in the harvest are correlated with, but are seldom the same as, those in the population because of differential vulnerability to hunting. This is discussed at length in the section on chronological distribution.

Geographically, the highest immature to adult ratios (2.0 and above) are found in harvests in the northern tier of States from Minnesota eastward, in Alaska, and in the southern half of the Pacific Flyway, whereas the lowest age ratios (less than 1:0) are found in the Central Flyway and the southern half of the Mississippi Flyway (Fig. 5). Despite a number of exceptions, there is a strong tendency for the regions with the higher age ratios to have the lower male to female ratios and vice versa. An analysis of harvest area averages for 1961-1970 showed that the age ratio was more closely correlated with the adult sex ratio ($r = -0.83$, $P<0.001$) than with the immature sex ratio ($r = -0.48$, $P < 0.001$). Differences in the total mallard harvest were not correlated with either the adult sex ratio ($r = 0.03$, $P > 0.50$) or the age ratio ($r = -0.09$, $P > 0.20$), but the harvest of adult mallards and the adult sex ratio showed a tendency to increase and decrease together ($r = 0.23$, $P < 0.025$) while the percentage of mallards in the harvest and their age ratio were inversely related ($r = -0.48$, $P < 0.001$). The biological significance of some of these relationships is uncertain, although the influences of both hunter selectivity and behavioral differences among the birds seem to be evident in some instances. This may be clarified when subsequent studies of banding data provide estimates of population size and composition.

Returning briefly to the population of harvest areas, the frequency distributions of the overall age ratios (low = 0.44, high = 3.98, average = 1.30) and adult (low = 0.53, high = 3.98, average = 2.02) and immature (low = 0.76, high = 2.36, average = 1.26) sex ratios were examined. The concentration of values in the lower portion of the range is again a prominent feature except for the adult sex ratios which show a much more symmetrical distribution.

Chronology of the Mallard Harvest

The size of the mallard population relative to the total duck population in an area changes with time, as do its sex and age compositions. Such changes in the population, which can reflect the effects of hunting pressure as well as the stage of migration, lead to changes in the composition of the harvest as time passes. By examining the composition of the harvest chronologically, some of the effects of time and hunting pressure on the population may become clearer.

Some information on the distribution of the harvest relative to time of day is presented and discussed in the section on general shooting hours. In this section, the characteristics of the harvest are examined by 5-day periods (except that months containing 31 days end with a 6-day period). Thus each month is divided into six periods with the first period starting on the first day of the month and the sixth period ending on the last day of the month. In many States the season is open only a part of some periods, most often the first and last periods (Sunday closures have been ignored throughout). Such differences in period length and the fact that periods contain varying numbers of weekend days are unimportant in comparisons of within-period calculations such as percentage of mallards and percentage of immature mallards; most calculations examined here are of this type.

However, the distribution of the mallard harvest among periods is of some interest also. Combining 10 years of harvest data should tend to equalize the effects of the uneven occurrence of weekend days in the various periods. To reduce the effects of unequal period length and provide a more uniform unit of measure for examining changes from period to period, a measure of hunting opportunity—the number of days during which the season was open in each period in a State (number of State season days)—has been used. This approach does not, of course, compensate for other sources of variation (e.g., combining years and States with different opening dates or season lengths). As an example to help clarify the

use of State season day, only twice between 1961 and 1970 did the duck season in Washington open as early as 10 October, the last day of the second period in October (Table A-2). Thus there were two State season days for this period, both opening days. Of the 50 dates during this 10-year period on which the season could have been open in the following 5-day period, Washington hunters were allowed to hunt on 31, of which 8 were opening days. These hunters bagged about 29,100 mallards in the second period of October and 314,600 mallards in the third. If each total is divided by the number of State season days represented, the comparison becomes 14,550 mallards per day vs. 10,150 mallards per day and a pattern begins to appear. Further refinements segregating opening days from others or weekend hunting from weekday hunting could be useful in special situations, as could information on the comparative numbers of hunter-days afield during each period, but such calculations would be hard to interpret and impractical for general use.

The number of State season days is also useful as an indicator of sample size. When the percentages for very early or late periods do not fit the rest of the pattern, the number of season days will often prove to be small, indicating that such estimates are based on only one or a few years or States.

Changes in the incidence of mallards in the harvest and in their age and sex compositions through the hunting season are examined separately.

Seasonal changes in relative size—The average incidence of mallards in the harvest during 1961-1970 has been summarized by 5-day periods at the State level (Table A-14) for 12 of the more important mallard harvest States representing various sections of the United States and for each flyway and the entire country (Table 8). Changes in the importance of the mallard in the harvest are indicated by the figures for "percent mallards in duck bag." Overall, no clearcut trends are apparent. Mallards appear to have increased in importance as the season progressed in the Mississippi Flyway but decreased in the Atlantic Flyway (Table 8). The sharp increases in late periods in the Pacific Flyway and overall U.S. figures are due to the Columbia Basin season. The figures for individual States are the most meaningful. In most of the States included in Table A-14, mallards increased in importance as the season progressed, but they decreased in California and New York. Since the size and direction of such changes reflect changes in the percentage of mallards in the duck population of an area as migration proceeds, this kind of information, adequately documented, can be helpful for formulating management practices, particularly the setting of hunting regulations.

Of special interest are the percentages of mallards bagged per season day per period. At State, flyway, and national levels alike, these figures bring out the importance of the opening day effect in concentrating the mallard harvest (and other harvest and hunting activity) in the early periods of the season. After the initial burst of activity, the mallard harvest per season day tends to stablize at a relatively low level through the remainder of the season. This is, of course, an average pattern, and there are sometimes marked differences among States. In such northern States as Montana, North Dakota, Minnesota, Wisconsin, and New York, mallard harvests are highly concentrated in the first few periods, but in States somewhat farther south, including California, Nebraska, Texas, Arkansas, and Louisiana, the harvests are comparatively low in the early periods. Two reasons for these differences are apparent: (1) The northern States tend to choose opening days in the same two or three 5-day periods year after year. Farther south, opening days tend to be spread over a longer time span, so the concentration effect that might be apparent in individual years is diluted when several years are combined; and (2) typically, mallard numbers are comparatively low in more southern areas when hunting seasons open, increasing later in the season.

A different pattern is found in data from Saskatchewan, where a Provincial survey provides annual harvest estimates for mallards and other ducks by weekly period (see Balez 1969, 1970, 1971, 1972, or [1973] for examples). Although the duck season in Saskatchewan has been open Province-wide by middle to late September in recent years, duck and mallard harvests generally peak the first 2 weeks of October. There is little indication of the opening-day effect found in the northern United States. Part of this difference may be due to a difference in hunter characteristics between the two countries; e.g., proportionally more Canadian hunters may come

Table 8. Average[a/] characteristics, by 5-day period, of the mallard harvest in each flyway and the United States, 1961-1970. (All mallard bloodlines included; experimental San Luis Valley, September Teal, and Late Black Duck seasons and the scaup-only and sea-duck only dates excluded; Ad = adults, Im = immatures.)

Period	% mallards in duck bag	% Im in mallard bag	% males in mallard bag: Ad	% males in mallard bag: Im	Total State season days	Mallard bag per season day: Total	Mallard bag per season day: %
Pacific Flyway (1961-1970)							
October 1-5	38.4	65.8	63.2	53.6	28	4,212	13.9
October 6-10	39.2	63.1	66.2	57.3	169	2,888	9.5
October 11-15	37.2	68.8	60.6	55.8	382	2,169	7.2
October 16-20	32.4	69.6	59.5	52.1	476	1,229	4.1
October 21-25	26.3	69.9	61.4	54.5	526	1,185	3.9
October 26-31	27.3	68.1	61.0	55.8	640	836	2.8
October 1-31	30.8	69.9	61.2	55.5	2,221	1,431	31.8
November 1-5	30.2	61.3	66.0	53.5	530	899	3.0
November 6-10	34.1	62.9	63.1	55.3	525	956	3.2
November 11-15	35.2	59.2	66.2	52.0	521	1,121	3.7
November 16-20	37.1	58.8	65.9	54.5	519	978	3.2
November 21-25	41.7	57.1	65.9	55.9	512	1,175	3.9
November 26-30	40.1	55.8	63.8	57.1	520	1,039	3.4
November 1-30	35.9	58.9	65.4	54.9	3,127	1,027	22.9
December 1-5	38.1	55.1	66.1	56.1	525	888	2.9
December 6-10	33.2	53.7	70.2	53.1	530	921	3.0
December 11-15	36.5	52.2	67.9	55.2	535	992	3.3
December 16-20	35.9	52.7	68.8	55.1	530	1,012	3.3
December 21-25	33.5	51.3	65.4	55.0	504	845	2.8
December 26-31	33.0	49.2	69.5	56.8	521	1,082	3.6
December 1-31	34.4	52.2	68.3	55.2	3,145	957	21.3
January 1-5	28.6	47.4	68.1	56.5	362	1,073	3.5
January 6-10	31.6	46.1	69.7	58.8	202	1,104	3.6
January 11-15	58.7	45.6	75.0	55.2	127	948	3.1
January 16-20	72.0	37.6	64.6	68.0	76	1,019	3.4
January 21-25	88.3	37.7	75.0	45.0	30	1,681	5.6
January 26-31					0		
January 1-31	31.8	45.8	68.3	56.0	797	1,079	24.0
All periods	33.3	59.3	65.9	55.2	9,290	1,121	99.9
Mississippi Flyway (1961-1970)							
October 1-5	28.1	77.6	43.5	55.3	23	27,444	32.9
October 6-10	30.2	75.8	48.1	53.5	86	10,943	13.1
October 11-15	33.3	72.7	47.2	53.7	145	6,205	7.4
October 16-20	32.3	67.8	52.0	52.4	180	3,219	3.9
October 21-25	33.1	65.8	52.9	53.8	234	2,920	3.5
October 26-31	36.2	60.8	57.9	54.2	352	2,282	2.7
October 1-31	32.9	70.0	51.4	53.8	1,020	4,449	44.9
November 1-5	40.0	55.7	64.0	56.0	374	2,235	2.7
November 6-10	42.8	53.8	65.6	57.2	373	1,682	2.0
November 11-15	46.4	55.0	66.9	56.8	340	1,853	2.2
November 16-20	44.4	52.9	68.6	59.3	296	1,791	2.1
November 21-25	47.2	51.5	67.4	58.4	263	2,432	2.9
November 26-30	46.6	49.1	70.9	57.6	258	3,242	3.9
November 1-30	41.5	53.7	66.9	56.9	1,904	2,153	21.7
December 1-5	47.9	50.0	70.7	55.6	271	2,367	2.8
December 6-10	47.6	46.1	70.6	55.6	292	1,914	2.3
December 11-15	42.5	46.4	73.3	53.6	284	1,981	2.4
December 16-20	42.7	44.6	72.2	55.4	295	1,799	2.2
December 21-25	44.0	43.8	73.8	54.9	325	1,487	1.8
December 26-31	44.5	44.7	73.4	55.1	365	1,349	1.6
December 1-31	42.9	46.3	72.4	55.4	1,832	1,785	18.0
January 1-5	47.0	43.7	71.7	58.2	191	1,468	1.8
January 6-10	42.3	44.3	75.9	57.9	96	1,710	2.1
January 11-15	43.6	35.6	63.9	68.4	40	1,364	1.6
January 16-20	46.7	61.3	(85.2)	(58.8)	7	1,677	2.0
January 21-31					0		
January 1-31	46.0	42.7	71.9	58.1	334	1,529	15.4
All periods	37.4	57.6	64.7	55.1	5,090	2,490	99.9
United States, except Alaska (1961-1970)							
October 1-5	30.2	70.9	55.3	55.9	92	10,683	28.5
October 6-10	31.4	66.1	60.5	53.8	440	4,350	11.6
October 11-15	34.0	68.5	56.6	54.5	928	2,518	6.7
October 16-20	32.5	64.2	59.3	53.8	1,239	1,391	3.7
October 21-25	31.3	63.8	60.8	54.8	1,429	1,295	3.5
October 26-31	33.5	59.4	63.4	56.0	1,768	1,093	2.9
October 1-31	32.6	66.0	59.2	55.0	5,896	1,822	40.4
November 1-5	36.6	55.2	66.6	56.1	1,511	1,233	3.3
November 6-10	38.0	55.4	67.0	57.7	1,484	1,035	2.8
November 11-15	39.5	54.5	68.4	56.4	1,499	1,108	3.0
November 16-20	36.7	53.3	68.7	57.3	1,538	941	2.5
November 21-25	35.4	52.5	68.6	57.0	1,667	1,025	2.7
November 26-30	34.1	51.2	68.3	56.5	1,707	1,031	2.7
November 1-30	36.2	53.7	68.0	56.8	9,406	1,061	23.5
December 1-5	34.1	51.1	69.1	56.5	1,665	833	2.2
December 6-10	33.0	48.6	71.4	53.9	1,666	772	2.1
December 11-15	33.9	48.0	71.7	54.5	1,679	828	2.2
December 16-20	33.1	47.5	71.2	55.6	1,705	785	2.1
December 21-25	32.6	46.8	71.6	55.2	1,687	689	1.8
December 26-31	30.4	46.8	71.8	56.4	1,776	769	2.1
December 1-31	32.5	48.1	71.3	55.4	10,178	779	17.3
January 1-5	28.3	45.0	69.6	57.7	1,055	822	2.2
January 6-10	26.1	43.0	69.4	60.1	538	896	2.4
January 11-15	58.8	43.1	73.5	54.7	281	765	2.0
January 16-20	72.3	38.9	64.6	68.7	103	949	2.5
January 21-25	88.3	37.7	75.0	45.0	30	1,681	4.5
January 26-31					0		
January 1-31	28.9	44.2	69.1	56.4	2,007	853	18.9
All periods	33.4	56.1	66.7	55.7	27,487	1,125	100.0

Period	% mallards in duck bag	% Im in mallard bag	% males in mallard bag: Ad	% males in mallard bag: Im	Total State season days	Mallard bag per season day: Total	Mallard bag per season day: %
Central Flyway (1961-1970)							
October 1-5	39.7	52.5	68.9	59.6	25	8,296	25.3
October 6-10	38.5	53.3	65.9	60.0	104	3,382	10.3
October 11-15	42.4	52.2	67.0	57.3	181	2,106	6.4
October 16-20	43.7	46.6	67.6	60.6	237	1,570	4.8
October 21-25	46.7	47.1	67.3	58.6	278	1,458	4.4
October 26-31	47.3	45.5	70.9	62.1	373	1,355	4.1
October 1-31	43.6	48.8	68.6	59.9	1,198	1,856	39.5
November 1-5	47.5	44.5	71.7	60.5	327	1,416	4.3
November 6-10	51.6	44.1	73.5	63.5	311	1,070	3.3
November 11-15	56.5	43.7	74.7	61.4	295	1,214	3.7
November 16-20	46.0	43.4	73.6	61.0	284	1,116	3.4
November 21-25	42.0	42.2	75.8	60.6	300	1,151	3.5
November 26-30	39.9	43.0	71.8	58.9	270	1,015	3.1
November 1-30	44.6	43.6	73.8	61.4	1,787	1,170	24.9
December 1-5	37.8	35.0	70.2	55.1	225	851	2.6
December 6-10	32.4	36.2	75.0	57.1	205	787	2.4
December 11-15	32.5	34.0	78.8	61.0	212	978	3.0
December 16-20	29.6	35.4	76.2	56.3	233	764	2.3
December 21-25	32.9	38.4	75.0	56.9	229	696	2.1
December 26-31	25.9	39.2	73.8	61.4	243	778	2.4
December 1-31	30.5	36.1	75.5	59.7	1,347	807	17.2
January 1-5	24.2	31.7	69.0	53.9	137	898	2.7
January 6-10	19.0	38.0	71.4	68.5	56	879	2.7
January 11-15	25.0	39.4	83.0	46.0	25	805	2.5
January 16-20	(44.8)[b/]	(19.2)	(90.8)	(100.0)	4	248	0.8
January 21-25					0		
January 26-31					0		
January 1-31	21.9	32.8	69.4	52.7	222	871	18.5
All periods	39.6	44.1	72.4	60.5	4,554	1,259	100.1
Atlantic Flyway (1961-1970)							
October 1-5	8.5	74.9	(33.8)	53.5	16	1,559	17.8
October 6-10	18.9	77.9	41.5	50.7	81	1,619	18.4
October 11-15	24.6	75.4	49.6	50.4	220	1,032	11.8
October 16-20	22.5	75.1	50.1	51.9	346	541	6.2
October 21-25	23.0	69.2	55.9	52.1	391	356	4.1
October 26-31	20.6	67.4	56.5	51.3	403	220	2.5
October 1-31	22.6	74.5	51.7	51.1	1,457	548	47.9
November 1-5	21.6	68.4	61.4	55.2	280	314	3.6
November 6-10	22.5	64.8	58.7	53.6	275	272	3.1
November 11-15	21.2	64.1	62.0	57.6	343	258	2.9
November 16-20	16.2	58.2	64.1	52.1	439	211	2.4
November 21-25	14.9	59.8	64.5	51.9	592	206	2.3
November 26-30	10.9	58.7	60.2	50.5	659	166	1.9
November 1-30	15.5	61.5	62.3	53.3	2,588	222	19.4
December 1-5	12.7	53.2	65.8	54.5	644	136	1.5
December 6-10	12.6	53.7	64.8	53.5	639	121	1.4
December 11-15	14.0	55.4	63.6	51.1	648	138	1.6
December 16-20	14.7	54.6	62.8	55.9	647	144	1.6
December 21-25	14.6	54.9	66.1	56.7	629	149	1.7
December 26-31	14.9	55.0	67.8	53.0	647	187	2.1
December 1-31	13.9	54.6	65.4	54.1	3,854	146	12.8
January 1-5	15.1	54.0	64.2	52.7	365	208	2.4
January 6-10	14.0	48.9	66.8	57.1	184	247	2.8
January 11-15	15.9	51.1	76.6	45.7	89	222	2.5
January 16-20	13.4	(40.6)	(49.3)	(48.2)	16	472	5.4
January 21-31					0		
January 1-31	14.9	52.6	66.1	51.6	654	227	19.9
All periods	16.8	64.0	60.9	52.6	8,553	247	100.0
Alaska (1966-1970)							
September 1-5	20.2	88.1	(51.9)	54.4	25	712	22.4
September 6-10	17.4	82.3	(56.2)	70.9	25	217	6.8
September 11-15	15.7	89.6	(12.0)	61.3	25	138	4.3
September 16-20	18.9	(92.9)	(0)	(44.4)	25	102	3.2
September 21-25	20.3	(82.0)	(27.1)	(48.3)	25	105	3.3
September 26-30	23.1	91.2	(62.4)	57.5	25	180	5.7
September 1-30	19.6	86.6	38.8	55.1	150	242	45.4
October 1-5	33.2	73.7	(40.7)	51.3	25	281	8.9
October 6-10	27.3	83.8	(49.7)	57.7	25	208	6.6
October 11-15	50.0	70.6	(62.6)	46.0	25	253	8.0
October 16-20	54.2	79.4	(54.2)	54.7	25	248	7.8
October 21-25	65.2	69.6	(39.7)	49.7	25	342	10.8
October 26-31	(48.4)	(85.8)	(33.3)	(58.3)	30	97	3.1
October 1-31	43.6	77.7	48.3	51.9	155	234	43.9
November 1-5	(41.2)	(83.9)	(61.1)	(46.7)	25	78	2.5
November 6-10	(66.9)	(53.1)	(100.0)	(26.7)	25	56	1.8
November 11-15	(46.9)	(55.9)	(66.7)	(25.0)	25	25	0.8
November 16-20	(32.7)	(68.0)	(90.0)	(80.9)	25	39	1.2
November 21-25	(13.7)	(100.0)	(--)	(0)	25	5	0.2
November 26-30	(72.8)	(52.4)	(44.4)	(69.5)	25	46	1.4
November 1-30	45.8	70.9	(83.8)	42.2	150	42	7.9
December 1-5	(50.0)	(42.9)	(75.0)	(33.3)	25	26	0.8
December 6-10	(50.6)	(100.0)	(--)	(66.7)	25	11	0.3
December 11-15	(29.0)	(50.0)	(0)	(0)	20	6	0.2
December 16-20					0		
December 21-25					0		
December 26-31					0		
December 1-31	(62.2)	(60.7)	(37.5)	(44.5)	70	15	2.8
All periods	28.1	81.1	51.0	53.8	525	155	100.1

a/ Figures involving season days calculated using cumulative harvest for entire span of years; other figures calculated by adding the annual estimates and dividing by the number of years.

b/ Estimates in parentheses based on information pertaining to fewer than 100 ducks or 50 mallards; dashes (--) indicate that no sample of birds was obtained for that period of the season.

from the farming community. F. G. Cooch (Canadian Wildlife Service, personal communication) has suggested that hunters in Canada tend to wait until the grain harvest ends, the less-desired species such as teal start southward, and those ducks remaining have fewer pinfeathers. Probably, differing duck population characteristics also play a part. If ducks in Saskatchewan are most available to hunters in premigration concentrations at staging areas and such large concentrations do not build up until early October, the difference would be explained. Possibly, such differences are related to hunting in a major breeding area as compared with hunting in migration or wintering areas as in most of the United States.

Seasonal changes in age and sex compositions.—As a rule, immature birds made up a decreasing proportion of the harvest as the season advanced, and the age ratio gives little indication of stabilizing even late in the season (Table 8). Again, some variability was evident at the State level. The age ratio tended to decrease in the States examined (Table A-14) except for North Dakota (increase) and Montana (irregular fluctuation).

The decreasing proportion of immature birds in the harvest through the season reflects in part the trend in the population. Older birds have the experience of at least one hunting season behind them. Young birds do not, and early-season hunters can be expected to take a much greater proportion of them than of adults. As the season advances, greater hunting and natural mortality will continue to disproportionately reduce the number of young birds. However, those that survive become increasingly wary, gradually approaching the behavior of adults. This results in the harvest for later periods showing an age composition which gradually approaches that in the population.

This discussion presupposes that the age classes are not segregated in time or space by, say, differential migration, and that all are exposed to the same hunting pressure. W. F. Crissey (U.S. Fish and Wildlife Service, personal communication) has pointed out that this may not be true. If young, growing birds require more food and make more daily feeding flights than adults, they may be exposed to more hunting pressure, particularly early in the season when their food requirements would be greatest. Studies apparently have not been conducted on this particular aspect, so the relative importance of the hunting-experience and feeding-behavior theories in accounting for differential vulnerability remains a matter of speculation. Neither theory accounts for the apparent failure of the age ratio in the harvest to begin leveling off later in the season.

There should be no important differences in hunting experience or fall feeding behavior within each age class, so differential vulnerability by sex should be independent of these factors. Among immature birds, males and females are believed to be present in equal numbers in the fall population. However, during 1961-1970, males averaged about 56% of the harvest of immature birds, a value that remained rather stable throughout the season, though there appear to be some differences among flyways (Table 8). This consistency suggests that hunter selectivity, probably relatively constant in most situations, is the main reason for the difference in immature sex composition between the harvest and the population. In contrast, the sex composition of adult mallards in the harvest changed during the season, the percentage of males increasing steadily through early December before leveling off (Tables 8, A-14). Neither hunter selectivity nor differential vulnerability satisfactorily explain this pattern, but differential migration may. If adult males tended to move south before the other birds and thus avoided some of the early-season hunting pressure, such a changing sex composition could result. On the basis of Duck Wing Survey Data, Pirkola and Lindén (1972) reached a similar conclusion about a differential migration among mallards in Finland. Banding data will be used to explore this and other matters related to the species, age, and sex compositions of the mallard harvest and the mallard population.

Unretrieved Kill

Technically, unretrieved kill is that part of his total kill that does not come into a hunter's possession. In this report, the term refers to all ducks shot down, but not retrieved, as reported by the hunters or by observers watching them. How closely this reported unretrieved kill approximates the actual unretrieved kill depends, possible reporting biases aside, on how closely the number of birds that are brought down but eventually recover from their injuries is balanced by the number of birds that do not come down when shot but sustain injuries that prove fatal later.

Because the mallard is the most important duck in the harvest in most parts of the country and is hunted with a wide variety of methods and in many habitat types, the unretrieved kill ratios estimated for duck hunting in general are probably more applicable to the mallard than to any other individual species. The following sections contain discussions of the unretrieved kill of ducks as reported by hunters in the Hunter Questionnaire Survey and of ducks and mallards as observed in the Hunter Performance Survey.

Hunter Questionnaire Survey

Ratios of ducks lost to ducks brought down, as estimated from this survey each year, are summarized by flyway in Table 9. On the average, slightly less than 19% of the ducks shot were reported as unretrieved; this percentage tended to be lowest in Alaska and the Pacific Flyway and highest in the two eastern flyways. Since the ratio of unretrieved kill to total kill is a charateristic that might be expected to show little fluctuation, its consistency from year to year might be viewed as a test of the survey's reliability. The survey passes this "credibility test" easily, with the averages for 1952-1961 (0.187 duck lost per duck brought down) and 1962-1974 (0.185 duck lost per duck brought down) being nearly identical.

Unretrieved kill differs in different hunting situations, of course. The type of hunting (such as jump shooting, pass shooting, and shooting over decoys), the type of habitat (open water, thick vegetation, swamp, marsh, stream, etc.), the type of equipment (wading boots, a boat, or a dog), and the type of duck encountered (puddle duck, diving duck or sea duck) all influence the hunter's ability to retrieve the birds he brings down. For example, both Hunter Questionnaire reports and field observations indicate that the unretrieved kill in sea duck hunting is substantially higher than average. Possibly, differences between the western and eastern regions of the country reflect somewhat different hunting situations predominating in each. Bellerose [Bellrose] (1953) discussed the influence on unretrieved kill of many of these and other situations, together with the problem of relating birds the hunter sees as unretrieved to birds not bagged but lost to the duck population as a result of gunshot wounds. Jahn and Hunt (1964) have also examined this subject in some detail.

Hunter Performance Survey

Unretrieved kill was defined more broadly the first 3 years of this survey than during subsequent years, and data for the 4th year are not available by State, so the earliest figures included here are from the 1965-66 season survey. The definition of unretrieved kill now used—those ducks that hunters bring down within their sight but fail to retrieve—is equivalent to that used in the Hunter Questionnaire Survey, so the results of the two surveys are comparable after 1965. It is seldom practical to try to make separate estimates for legally and illegally killed birds; both surveys generally provide estimates of the combined total.

Table 10 summarizes comparisons of unretrieved kill from the two surveys. The most significant result of these comparisons is that hunter reports from the Questionnaire Survey agree very well with reports by observers in the Performance Survey before adjustment of the Questionnaire Survey bag data for response bias. After adjustment, Questionnaire Survey figures on unretrieved kill tend to be significantly higher than those from the Performance Survey. This finding raises some fundamental questions about the bias adjustment procedures and their application. The more intensive Hunter Questionnaire Survey work conducted for several experimental duck seasons has suggested that nonresponse bias may not be negligible, as was believed (Atwood 1956), but may be even more im-

Table 9. Summary, by flyway, of annual Hunter Questionnaire Survey estimates of the relative size of the unretrieved duck kill, 1952-1974. (Ratios derived from bias-adjusted figures tabulated by State of duck stamp purchase; all U. S. waterfowl seasons included.)

Hunting season	Unretrieved kill rate (ducks lost per duck brought down)						
	Alaska	Pacific Flyway	Central Flyway	Mississippi Flyway	Atlantic Flyway	Entire United States Excluding Alaska	Entire United States Including Alaska
1952-53	0.165	0.179	0.229	0.241	0.236	0.218	0.218
1953-54	0.128	0.147	0.189	0.206	0.214	0.185	0.184
1954-55	0.127	0.162	0.188	0.206	0.195	0.187	0.187
1955-56	0.158	0.156	0.182	0.215	0.204	0.191	0.191
1956-57	↑	0.163	0.180	0.206	0.208	0.189	→
1957-58		0.153	0.176	0.194	0.200	0.179	
1958-59		0.159	0.183	0.214	0.206	0.189	
1959-60		0.143	0.156	0.186	0.190	0.168	
1960-61		0.153	0.184	0.212	0.191	0.187	
1961-62		0.156	0.180	0.205	0.192	0.181	
1962-63		0.177	0.212	0.219	0.210	0.198	
1963-64		0.165	0.200	0.215	0.199	0.192	
1964-65	↓	0.176	0.196	0.201	0.198	0.192	←
1965-66	0.160	0.172	0.213	0.192	0.207	0.190	0.190
1966-67	0.159	0.155	0.195	0.193	0.194	0.183	0.183
1967-68	0.148	0.163	0.184	0.187	0.201	0.180	0.180
1968-69	0.145	0.171	0.184	0.209	0.191	0.188	0.188
1969-70	0.167	0.162	0.192	0.195	0.192	0.184	0.184
1970-71	0.142	0.156	0.171	0.181	0.193	0.174	0.174
1971-72	0.138	0.154	0.187	0.193	0.193	0.181	0.181
1972-73	0.144	0.146	0.182	0.202	0.200	0.182	0.182
1973-74	0.147	0.162	0.174	0.188	0.202	0.180	0.180
1974-75	0.125	0.150	0.186	0.187	0.190	0.177	0.177

Not in survey

Alaska not in survey

Table 10. Comparisons of Hunter Questionnaire Survey (HQS) and Hunter Performance Survey (HPS) data on the unretrieved kill of ducks.

Data used	Flyway	Number of States in which HQS data showed the higher proportion unretrieved:number in which HPS data showed the higher proportion unretrieved, by season							χ^{2} [a]
		1965-6	1966-7	1967-8	1968-9	1969-70	1970-71	Combined	
Regular season; HQS bag estimates adjusted for response biases.	Atlantic	9:6	11:5	12:5	9:7	11:5		52:28	7.20**
	Mississippi	10:3	7:5	5:2	7:3	10:0		39:13	13.00**
	Central	3:4	4:5	7:3	6:2	5:2		25:16	1.98
	Pacific	3:4	4:3	3:4	1:6	3:4		14:21	1.40
	Combined	25:17	26:18	27:14	23:18	29:11		130:78	13.00**
	χ^{2} [a]	1.52	1.45	1.99	0.61	4.00*		13.00**	
Regular season; HQS bag estimates not adjusted for response biases.	Atlantic	9:6	9:7	10:7	7:9	11:5		46:34	1.80
	Mississippi	8:5	5:7	3:4	6:4	10:0		32:20	2.77
	Central	3:4	4:5	4:6	4:4	4:3		19:22	0.22
	Pacific	2:5	3:4	2:5	0:7	3:4		10:25	6.43*
	Combined	22:20	21:23	19:22	17:24	28:12		107:101	0.17
	χ^{2} [a]	0.10	0.09	0.22	1.20	3.16		0.17	
September teal season; HQS bag estimates not bias-asjusted.	Mississippi	3:6	5:4	5:6	No season	5:4	5:3	23:23	0
	Central	4:5	3:6	2:5		3:4	1:2	13:22	2.31
	Combined	7:11	8:10	7:11		8:8	6:5	36:45	1.00
	χ^{2} [a]	0.89	0.22	0.89		0	0.09	1.00	

[a] χ^{2} value for test of the null hypothesis, H_o (count for HQS÷count for HPS = 1); *indicates rejection of H_o with 95% confidence and ** indicates rejection with 99% confidence.

portant than response bias in some situations. In addition, response bias may also affect unretrieved kill reports since most hunters take pride in their shooting ability and cannot be expected to minimize the number of birds they hit, since a hit rates better than a miss even if the bird still manages to get away. In the early years of the Questionnaire Survey, both retrieved and unretrieved kill estimates were routinely adjusted downward by bias removal procedures. The adjustment of unretrieved kill reports was subsequently eliminated in the belief that hunters would tend to be conservative in reporting unretrieved kill. The findings here raise anew the questions of response vs. nonresponse bias and exaggeration in unretrieved kill reports.

The downward adjustment of duck bag reports by hunters is still appropriate, but labeling it as an adjustment solely for response bias can be questioned. A strong argument can be made for also adjusting unretrieved kill estimates downward. We have therefore calculated the relationship which existed between unretrieved and total kills before any adjustments were applied (Table A-15) for comparison with the bias-adjusted figures (Table 9). The unadjusted data have the same characteristics as the adjusted: long-term stability, with averages for the first 10 years almost identical to those for the last 13, and a tendency toward a slight west-to-east increase by flyway. However, this approach indicates that instead of an average unretrieved duck kill of almost 19%, a figure of about 15% may be more realistic. Special questionnaire survey data (unadjusted) obtained during the 1965-1970 September teal seasons indicated an average unretrieved kill rate of 14%, not significantly different from Hunter Performance Survey data collected during these seasons (Martin et al., unpublished manuscript). In contrast, unadjusted Hunter Questionnaire Survey figures from the experimental San Luis Valley season yielded an unretrieved kill estimate of 13%, whereas the Hunter Performance Survey estimate was 19%. The San Luis Valley Hunter Performance data, however, appear to be more dependent on information collected on public hunting areas, and as Bellerose [Bellrose] (1953:340) states, "Records from public shooting grounds, of course, show the greatest loss in unretrieved ducks," i.e., losses on such areas are greater than the overall average. As additional evidence, a study conducted on public hunting areas around the country in 1973 and 1974 to compare the effectiveness and unretrieved kill rates for hunters using lead and steel shot (no significant differences were found) showed an average unretrieved kill rate of 18% (Martin and Kimball 1975), approaching the 19% figure for the San Luis Valley.

In general, however, data compiled from a variety of other sources (Jahn and Hunt 1964; Bellerose [Bellrose] 1953) do not support such low unretrieved kill rates. Bellrose, for example, viewed the average rate of 22.5% he obtained as a minimum figure. Boyd (1971) obtained a rate of 24.8% for eastern Canada based on 1968 and 1969 Hunter Performance Survey data. Obviously, further study is needed on the accuracy of unretrieved kill estimates. Meanwhile, the adjusted figures currently in use (those averaging about 19%) appear to provide an acceptable compromise between extremes.

Analysis of variance confirms that unretrieved kill rates show consistent differences among States as well as flyways. Therefore, although the use of flyway or national averages would probably be acceptable for many purposes, unretrieved kill rates calculated at the State level are better for work with State figures. State unretrieved kill rates appear to be relatively stable year after year, so average figures have been calculated for each State, with and without bias adjustment (Table A-16). These can be used to estimate unretrieved kill in specific areas with somewhat greater accuracy than provided by flyway-level figures.

In addition to serving as an independent check on hunter reports of unretrieved kill, Hunter Performance Survey figures provide a basis for determining if the unretrieved kill of mallards differed from that of all ducks under the hunting regulations in effect in the United States during 1965-1969 (Table 11). There is no discernible difference between the two in this rather large sample of data, even though mallard regulations became quite restrictive for several years during this period. Therefore, it seems appropriate to use the same unretrieved kill rate for mallards as for ducks in general under such circumstances. Boyd (1971) also found the unretrieved kill rate for mallards (27.0%) to be about the same as that for all ducks (24.8%), although unretrieved kill rates were somewhat higher for large ducks than for small ones.

Table 11. Comparisons of unretrieved kill rates for mallards (M) and for all ducks (D) during regular hunting seasons, 1965-1969, based on Hunter Performance Survey estimates.

Flyway		Hunting season 1965-66	1966-67	1967-68	1968-69	1969-70	Combined
Atlantic	Total States	8	11	10	13	12	54
	Average D-M	0.083	-0.045	0.042	0.110	-0.070	0.022
	t-value[a]	1.051	-0.579	0.437	3.416**	-0.758	0.633
Mississippi	Total States	12	11	7	8	9	47
	Average D-M	0.006	-0.075	-0.060	0.020	0.006	-0.020
	t-value[a]	0.273	-0.813	-2.326	0.459	0.363	-0.840
Central	Total States	6	8	9	7	6	36
	Average D-M	0.127	0.012	0.017	-0.017	0.031	0.030
	t-value[a]	1.993	0.340	1.383	-0.485	1.499	1.827
Pacific	Total States	7	5	7	6	7	32
	Average D-M	0.035	0.019	0.033	-0.066	0.035	0.013
	t-value[a]	1.034	1.980	1.024	-1.114	2.128	0.809
Combined	Total States	33	35	33	34	34	169
	Average D-M	0.053	-0.032	0.012	0.032	-0.010	0.010
	t-value[a]	2.117*	-0.848	0.385	1.391	-0.311	0.746

[a] Calculated to test the hypothesis that there is no difference between the proportion unretrieved for all ducks and the proportion unretrieved for mallards (H_o: Average D-M = 0); *indicates rejection of H_o with 95% confidence and ** indicates rejection with 99% confidence.

U.S. HUNTING ACTIVITY AND MALLARD HARVEST DURING SPECIAL AND EXPERIMENTAL SEASONS

Special and experimental duck seasons differ from the regular duck season by their regulations, which often include different season dates and bag limits. A special season is management-oriented and relies on regular surveys for evaluation, whereas an experimental season is research-oriented, usually with one or more special surveys designed for its evaluation. This section summarizes results of three special and experimental duck seasons: the Special Columbia Basin Season, the Experimental San Luis Valley Season, and the Experimental High Plains Season. Certain regulations for these seasons were designed to affect the harvest (and hunters) in specific ways, though some less predictable results were expected as well. The effects on the mallard harvest and hunters will be examined in this report.

Columbia Basin Season

This is a special season conducted since 1961 in a region with a large wintering population of mallards subjected to light hunting pressure, and its regulations (Table A-3) have been somewhat more liberal than those in the rest of the Pacific Flyway. The Columbia Basin area has been repeatedly enlarged by boundary changes in Washington and Idaho, so examination of mallard harvest area data does not reveal very much about this season. Therefore, as no provisions were made for either special harvest surveys or more detailed analyses of regular harvest survey data, more specific harvest information for this season is not available. In essence, the Columbia Basin Season has been so enmeshed with the regular season that it is futile to analyze it as a separate entity. However, information has been gleaned from the Duck Wing Survey showing the effects of this season's special shooting hours and bag limits and is presented in later sections.

San Luis Valley Season

This experimental season was conducted in Harvest Area 2 in Colorado from 1963 through 1970. It may be characterized as an early season (premigration and early migration) in an area with a substantial breeding population of ducks, mainly mallards, that appeared to be comparatively independent of other populations. Besides providing additional data on population interchange, this season provided an opportunity for testing the effects, both on ducks and hunters, of increased hunting pressure as a management technique and of some innovations in the hunting regulations. The regulations tested (Table A-4) included such things as half-day shooting, restrictions and bonuses to shift shooting pressure toward mallard drakes under the fixed-limit system and several versions of a point-limit system designed to shift shooting pressure away from certain ducks and toward others.

Special surveys of the duck population, production, and harvest and an extensive banding program were conducted in the evaluation of this experimental season. A detailed analysis has been completed by Hopper et al. (1975). Data on hunting activity and success and the characteristics of the mallard harvest are summarized here (Table 12). Mallards consistently made up a lower fraction of the duck harvest but had a higher age ratio during this early season than during the regular season.

High Plains Season

This season was also designed to make more use of a large, reportedly underharvested, mallard population wintering in the western part of the Central Flyway (Grieb et al. 1970). In the first 2 years (1968 and 1969), it was conducted as an experimental late season involving special regulations and re-

Table 12. Estimates of annual hunting activity and mallard harvest characteristics for the experimental San Luis Valley season.

		Hunting season							
		1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71
Total active hunters		1,590	2,420	2,770	3,180	3,400	3,160	3,030	3,200
Total hunter-days		4,350	5,800	7,480	7,360	7,220	8,120	7,690	8,550
Characteristics of mallard bag	Number: Adult males	2,660	2,400	2,740	2,270	3,490	3,300	3,110	3,490
	Number: Adult females	2,160	1,780	1,080	1,620	1,460	1,130	860	1,280
	Number: Immature males	2,360	3,980	6,030	5,740	4,110	4,830	4,950	3,840
	Number: Immature females	1,500	1,780	5,590	4,700	2,380	1,720	1,730	2,170
	Number: Total	8,690	9,940	15,440	14,340	11,440	10,980	10,650	10,790
	Percent mallards	86.9	73.8	77.8	73.7	71.6	75.8	67.5	54.9
	Age ratio	0.80	1.38	3.04	2.68	1.31	1.48	1.68	1.26
	Sex ratio (Adult)	1.23	1.35	2.54	1.40	2.38	2.93	3.60	2.72
	Sex ratio (Immature)	1.57	2.23	1.08	1.22	1.73	2.80	2.86	1.77
Total bag of other ducks		1,310	3,510	4,410	5,120	4,540	3,510	5,130	8,860
Total duck bag		10,000	13,450	19,850	19,450	15,980	14,490	15,770	19,650
Total unretrieved duck kill[a/]									
	Reported	1,590[b/]	2,110	3,700	2,620	2,500[c/]	2,080	2,500	2,490
	Adjusted	2,500[b/]	2,790	4,270	4,710	2,500[c/]	3,310	3,510	5,970
Total duck kill[a/]									
	Reported	11,590[b/]	15,560	23,550	22,070	18,480[c/]	16,570	18,270	22,130
	Adjusted	12,500[b/]	16,240	24,120	24,160	18,480[c/]	17,800	19,280	25,620

a/ Reported unretrieved kill based on Questionnaire Survey; adjusted figures based on Hunter Performance Survey.

b/ No Hunter Performance Survey conducted in 1963; unretrieved kill of 20% assumed.

c/ 1967 Hunter Performance Survey figure unrealistically low (9.4% unretrieved); unadjusted estimate retained.

Table 13. Estimates of annual hunting activity and mallard harvest characteristics for the experimental duck hunting seasons in the High Plains area of the Central Flyway (based principally on data from surveys conducted by each State wildlife agency).

		1968-69 season				1969-70 season						
		Montana	Wyoming	Colorado	Total	Montana	South Dakota	Wyoming	Nebraska	Colorado	New Mexico	Total
Total active hunters		2,140	2,050	11,080	15,270	2,590	1,020	2,450	7,510	11,280	1,840	26,690
Total hunter-days		8,330	8,240	42,880	59,450	10,760	3,460	10,070	36,550	44,910	6,850	112,600
Characteristics of mallard bag	Number: Adult males	10,240	7,510	27,980	45,730	8,380	3,950	7,130	34,040	20,110	2,320	75,930
	Number: Immature males	2,660	2,860	5,880	11,400	6,040	1,260	3,060	9,190	10,060	1,480	31,090
	Number: Females	480	270	2,670	3,420	1,290	480	1,270	2,000	3,230	860	9,140
	Number: Total	13,390	10,640	36,520	60,550	15,710	5,690	11,460	45,240	33,400	4,660	116,160
	Percent mallards	98.7	99.0	96.7	97.5	99.0	98.1	97.8	98.5	93.1	74.0	95.6
	Age ratio (Males)	0.26	0.38	0.21	0.25	0.72	0.32	0.43	0.27	0.50	0.64	0.41
	Sex ratio (Overall)	26.7	39.0	12.7	16.7	11.1	10.9	8.0	21.6	9.3	4.4	11.7
Total bag of other ducks		180	110	1,260	1,550	150	110	250	690	2,480	1,630	5,330
Total duck bag		13,570	10,740	37,790	62,100	15,870	5,800	11,710	45,930	35,890	6,290	121,490
Total unretrieved duck kill[a/]		3,590	1,690	5,900	11,180	2,310	550	1,690	9,810	7,180	1,260	22,790
Total duck kill		17,160	12,430	43,690	73,280	18,180	6,350	13,400	55,740	43,060	7,550	144,280

a/ Based on Hunter Performance Survey data.

quiring participants to obtain permits. In 1970, the regular season in the original area (Central Flyway portions of Montana, Wyoming, Colorado, and New Mexico and Harvest Area 1 in both South Dakota and Nebraska) adopted many of the features of this experimental late season, which was then discontinued. More recently, other areas farther east were added so that all or parts of nine States were included by 1972.

The wildlife agencies of the States involved handled the increased banding effort and the population and harvest survey work connected with this season, including data analysis and report preparation. The data on hunting activity and harvest summarized here (Table 13) are derived largely from the work done in these States (Grieb et al. 1970; Funk et al. 1970), data from Fish and Wildlife Service surveys have been incorporated into some of the mallard bag composition estimates.

CANADA'S HUNTING REGULATIONS, HUNTER PARTICIPATION, AND MALLARD HARVEST

This section contains brief summaries of Canada's duck hunting regulations, migratory game bird hunting permit sales, and harvest survey procedures and limitations, together with those harvest survey results relating to the mallard. Information from Canada's Hunter Performance Survey is noted in other sections.

Duck Hunting Regulations

Canadian duck hunting regulations have much in common with those in the United States. In both countries the Federal Government is responsible for protection of migratory birds. There are quite similar restrictions on the methods and equipment that can be used in hunting and these, together with season dates, shooting hours, bag and possession limits, and special bonuses and restrictions on particular species, make up the main body of regulations in both countries. The source of the information in this section is the official summary of migratory bird regulations published annually by the Canadian Wildlife Service. These summaries advise that Provincial regulations may include additional restrictions.

Season dates and length, which are set by management district or area in most Provinces, often differ from area to area and are not well suited for meaningful summarization in tabular form. In general, seasons in Canada have been longer than those in nearby parts of the United States, with opening dates as early as 1 September. Of course, for practical purposes, the closing date in many areas is often determined more by weather (freeze-up) than by calendar date.

Bag and possession limits usually apply to an entire Province, but they may differ for nonresident, resident, and native (Indian or Eskimo) hunters. The limits summarized here (Table 14) are those that generally apply to non-natives. In addition to the bag and possession limits shown, season limits were in effect from 1948 through 1952. Bonuses and restrictions on particular species have often been in effect, but only those on mallards and black ducks are included in the summary. In some instances, the possession limit indicated carries the stipulation that any birds in excess of a specified number may be held only in the possessor's residence or in a cold-storage locker. The Yukon and Northwest Territories have been omitted from this summary since no other information about hunting in these Territories was available until 1974, at which time the daily duck limit was 25 for residents, and nonresidents were allowed 8 daily and 16 in possession.

Since 1962, shooting hours for all of Canada have run from ½ hour before sunrise to ½ hour after sunset, except for occasional 11:00 a.m. or noon starting times on opening day in some areas. Shooting hours before 1962 were similar except in British Columbia where nighttime hunting restrictions were reduced or omitted entirely.

Starting with the 1966-67 season, all hunters of

Table 14. Summary, by Province, of basic limits (daily bag:possession) for ducks other than sea ducks and mergansers, with mallard limits in parentheses and black duck limits in brackets when different, for duck seasons in Canada, 1948-1974.

Hunting season	Province									
	British Columbia	Alberta	Saskatchewan	Manitoba	Ontario	Quebec	Newfoundland	New Brunswick	Prince Edward I.	Nova Scotia
1948-49	8:16	8:16	8:16	7:14	7:14	7:14	– [a]	7:14	7:14	7:14
1949-50 through 1951-52	8:16	8:16	8:16	8:16	7:14	7:14	7:∞-25:∞ [b/c]	7:14	7:14	7:14
1952-53	8:16	8:16	10:20	8:16	7:14	7:14	7:∞-25:∞ [b/c]	7:14	7:14	7:14
1953-54	8:32	8:32	10:40	10:30	8:16	8:16	8:∞-25:∞ [b/c]	8:16	8:16	8:16
1954-55	10:40 (8:32)	8:32	10:40	10:30	8:16	8:16	8:∞-25:∞ [b/c]	8:16	8:16	8:16
1955-56 through 1957-58	10:40 (8:32)	10:40	15:45	10:30	8:16	8:16	8:∞-25:∞ [b/c]	8:16	8:16	8:16
1958-59	10:40 (8:32)	10:40	12:36	10:30	8:16	8:16	8:∞-25:∞ [b/c]	8:16	8:16	8:16
1959-60	8:32 (8:28)	7:21	7:21	7:21	6:12	6:12	6:∞-25:∞ [b/c]	6:12	6:12	6:12
1960-61	8:32 (8:28)	7:21	8:24	7:21	6:12	6:12	6:∞-25:∞ [b/c]	6:12	6:12	6:12
1961-62	6:24	5:10	5:10	5:10	5:10	6:12	6:∞-25:∞ [b/c]	6:12	6:12	6:12
1962-63	6:24	4:8	4:8	4:8	5:10	6:24	6:∞-25:∞ [b/c]	6:12	6:12	6:12
1963-64	8:28	5:10 (4:8)	5:10 (4:8)	5:10 (4:8)	5:10	6:24	6:∞-25:∞ [b/c]	6:12	6:12	6:12
1964-65	8:32	5:10 (4:8)	5:12 (4:8)	5:12 (4:8)	5:10	6:24	6:∞ [c]	6:12	6:12	6:12
1965-66	8:32	5:10 (3:6)	5:10 (3:6)	5:10 (3:6)	5:10	6:24	6:∞ [c]	6:12	6:12	6:12
1966-67	8:32	6:12 (3:6)	6:12 (3:6)	6:12 (3:6)	5:10	6:24	6:∞ [c]	6:12	6:12 [4:8] [e]	6:12 [d]
1967-68	8:32	8:16 (5:10-8:16) [b]	8:16 (5:10)	8:16 (2:4) [f]	5:10	6:24	6:∞ [c]	6:12	6:12 [4:8] [e]	6:12
1968-69	8:32	8:16 (3:6-4:8) [b]	5:10 (3:6)	5:10 (2:4)	5:10	6:24	6:∞ [c]	6:12	6:12 [4:8] [e]	6:12
1969-70	8:32	8:16 (5:10-8:16) [b]	7:14 (4:8-5:10) [b]	7:14 (4:8)	5:10	6:24	6:∞ [c]	6:12	6:12 [4:8] [e]	6:12
1970-71	8:32	8:16	10:20 (8:16)	8:16 (5:10)	5:10	6:24	6:∞ [c]	6:12	6:12 [4:8] [e]	6:12
1971-72	8:16	8:16	10:20 (8:16)	8:16 (5:10)	5:10	6:12	6:∞ [c]	6:12	6:12 [4:8]	6:12
1972-73	8:16	8:16	10:20 (8:16)	8:16 (5:10)	5:10	6:12	6:12	6:12	6:12 [4:8]	6:12
1973-74	8:16	8:16	8:16	6:12 (3:6)	5:10	6:12	6:12	6:12	6:12 [4:8] [e]	6:12
1974-75	8:16	8:16	8:16	6:12 (2:4)	5:10	6:12	6:12	6:12	6:12 [4:8]	6:12

a/ Newfoundland was not part of Canada this season so this information is not included in Canadian summaries.
b/ Daily bag limit varying by management district.
c/ ∞ = possession unlimited.
d/ Season closed on black duck until after 24 October resulting in seasons being 10 or 24 days shorter on black ducks than on other ducks, depending on management district.
e/ Season closed on black duck for the first 14 calendar days (1966-1968 and 1973), 12 calendar days (1969), or 13 calendar days (1970) of the duck season.
f/ Season closed on mallard for the first 10 calendar days of the duck season in the South Harvest Area.

migratory birds in Canada, except natives engaged in subsistence hunting and persons hunting in the Yukon or Northwest Territories, have been required to have a Federal permit, sold for $2.00 at all post offices, in addition to any Provincial licenses that are required (Benson 1971*a*). (This permit requirement was extended to include the Yukon and the Mackenzie District of the Northwest Territories in 1974.) This permit system is broader than the duck stamp system in the United States in that (1) it applies not just to waterfowl hunters but to all migratory game bird hunters, and (2) the name and address of each hunter is obtained. The Federal Government has set no age limit on permit holders; minimum age requirements are set by Provincial law and vary from Province to Province. About 2% of the permits issued each year have gone to persons less than 16 years old (F. G. Cooch, personal communication).

Federal Harvest Surveys: Procedures and Limitations

With the institution of the Federal permit in 1966, the Canadian Wildlife Service acquired a sampling frame for surveys of migratory game bird hunters. From the list of people obtaining permits in 1966, samples were drawn for Harvest (Hunter Questionnaire) and Species Composition (Parts Collection) Surveys to be conducted in 1967. These surveys are quite similar to their counterparts conducted in the United States, although modified to meet the specific requirements of the Canadian Wildlife Service. Most Provinces are stratified geographically into two or three zones, and harvest estimates are made for each such zone (Benson 1971*a*).

The original sampling plan, based on a mailing list 1 year old and thus omitting new hunters, was followed through 1971. Changes indicated by investigations of sampling bias (Sen 1970*a*, 1970*b*, 1971*a*) were implemented in 1972 and both the 1-year-old list and the current list have been used since that time. Response and nonresponse biases have also been investigated. As with the surveys in the United States, it appears that sampling error alone gives no cause for concern (Sen 1971*b*) but that important biases may be present. A recent change in the analysis that has had a significant effect on survey results in the calculation of the total bag of each species by weekly period. This procedure has been adopted to reduce bias in estimates of the species composition of the harvest and will soon be applied to the age and sex compositions as well (Cooch and Kaiser 1973). As a result, the harvest estimates now being used differ somewhat from those in earlier reports. Other procedural changes in sampling and analysis can be expected to result in further modifications, possibly including both response bias adjustments of the type used in the United States and adjustments for nonresponse bias, the subject of a recent study by Filion (1974).

Permit Issuance and Hunter Participation

Records of permit issuance, reported to be over 98% complete as received from the Canada Post Office, are summarized in Table 15 (Benson 1971a, 1971b; Cooch et al. 1974*a*). The reports available on hunting activity have largely been oriented around potential, active, and successful hunters of migratory game birds in general. Identifying these groups among waterfowl hunters has not been emphasized and such figures are still incomplete. However, the information available indicates that in most areas the vast majority of people obtaining permits plan to hunt waterfowl, since about 80% apparently do hunt waterfowl. This figure is nearly as high as the proportion of U.S. duck stamp buyers who are active waterfowl hunters (84 to 85%).

Mallard Harvest Areas

The survey results and related material in the following section are presented by mallard harvest area. For this report, each Province constitutes a mallard harvest area except for Alberta, Sas-

Table 15. Summary of annual Canadian migratory game bird hunting permit sales by Province of purchase, 1966-1974. (Permits with Province of purchase unknown are prorated.)

Province	Numbers of migratory game bird hunting permits sold								
	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75
Yukon	0	0	0	0	0	0	0	0	323
Mackenzie District, NWT	0	0	0	0	0	0	0	0	591
British Columbia	32,394	33,292	33,314	32,818	31,399	30,251	31,034	33,456	27,764
Alberta	52,911	56,055	53,645	53,691	60.079	62,957	63,312	67,012	66,127
Saskatchewan	44,744	44,781	43,613	45,422	47,796	49,491	50,007	51,307	51,504
Manitoba	37,784	35,724	38,728	41,680	39,291	40,995	41,135	41,711	37,167
Ontario	144,063	146,919	139,238	134,260	135,442	133,679	131,434	141,277	136,469
Quebec	35,868	32,585	37,125	39,543	46,081	50,320	53,085	57,247	58,345
Newfoundland	13,269	14,906	17,652	19,121	21,380	23,480	23,683	27,919	25,127
New Brunswick	8,535	7,761	9,562	10,127	10,309	11,156	11,336	12,869	11,916
Prince Edward Island	3,271	3,103	3,650	3,800	3,932	4,517	4,492	4,972	5,038
Nova Scotia	7,220	7,906	9,026	8,863	9,941	11,391	12,159	15,071	13,791
Total	380,059	383,032	385,553	389,325	405,650	418,237	421,677	452,841	434,162

katchewan, and Manitoba, which are subdivided into north and south harvest areas. In Alberta the dividing line between harvest areas is approximately 52° N latitude; in Manitoba it is 53° N (Benson 1969). In Saskatchewan it approximately followed a line drawn from 53° 35′ N on the west to 52° 50′ N on the east (Benson 1969) until 1971, when it was moved southward 50 to 100 miles (80 to 161 km, Cooch et al. 1972*a*). Exact descriptions of the boundaries are given in the references cited. The portion of Canada lying outside the 10 Provinces constitutes a single mallard harvest area, for which no harvest data are available until 1974.

Mallard Harvest Data from Federal Surveys

Canadian Wildlife Service personnel have kindly made available for this report their current estimates (Table 16) of the size and composition of the mallard harvest in Canada for the period covered by their surveys (Benson 1968; Anon. 1968; Cooch et al. 1972*b*, 1974*b*; Cooch and Kaiser 1973). Since analytical procedures for the Canadian surveys are still in the developmental stage, these results are subject to revision as further improvements are made. When age and sex data are recalculated by weekly periods, the age ratio will be reduced substantially, and marked changes may also occur in at least the adult sex ratio (F. G. Cooch, personal communication).

Of the mallards harvested during the 8-year period for which survey figures are available from both nations, about 27% (range: 23 to 30%) were taken in Canada. In general, higher age ratios have prevailed among birds bagged in Canada, whereas U.S. harvests have shown higher sex ratios, particularly among adults. The changes from year to year in the size and composition of the mallard harvests in the two countries have been similar in direction though not in magnitude. Possibly, changes in the harvest more closely represent actual changes in the mallard population in Canada (where hunting regulations have been relatively uniform) than in the United States, where regulations have undergone greater and more frequent changes in response to population changes.

Harvest Data from Provincial Surveys

Many of the Provincial wildlife departments have carried out annual game harvest surveys, some since 1950 and one or two even longer. The sampling plans used have varied widely in sophistication and consistency of application among both Provinces and years. Voluntary returns of questionnaires issued as a part of the hunting license have been tabulated in Alberta through about 1956 (R. Webb, personal communication to E. L. Atwood; D. J. Neave, personal communication; K. H. Macauley, personal communication), in Manitoba through 1968 (C. A. Scott, personal communication), in New Brunswick through 1969 (J. C. Baird, personal communication), and in Newfoundland (Inder and Gillespie 1974). Sample surveys with mailed questionnaires have been conducted in British Columbia (Finegan [1969]), Saskatchewan (Anon. 1960, [1961], [1962], [1963], [1964]; Mellis [1965], [1966], 1967, 1968; Balez, 1969, 1970, 1971, 1972, [1973], [1975]; and Ross [1976]), Manitoba since 1969, and New Brunswick since 1970. In Alberta in 1966 and 1967, waterfowl were included in a telephone questionnaire survey. These have all been general game harvest surveys that usually included ducks and geese, sometimes specifying at least a few major species like the mallard. The data for Newfoundland (where very few mallards are taken) are not included here because they have been summarized only for selected species, not including the mallard. Except for British Columbia's duck wing survey in 1966 (Finegan [1967]), they have all relied on the hunter's ability to identify species.

The reliability of these data is as variable as are the procedures for obtaining them. Data from license-form-questionnaire returns are the least reliable, becoming even less reliable with successive hunting seasons. Figures from sample surveys are generally much more reliable. For example, Finegan ([1966], [1967], [1968], [1969]), who also compared the results

Table 16. Summary of Canadian mallard harvest data by harvest area and Province, 1967-1974. (Estimated total numbers bagged together with their age and sex ratios; Ad = adult, Im = immature, M = male, F = female.)

Province	Harvest area		Hunting season 1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75
British Columbia	Combined	Total bag	166,700	133,800	131,900	133,800	113,700	114,800	106,000	108,600
		Im:Ad	3.5	2.4	5.0	4.1	3.4	3.0	3.1	3.7
		M:F (Ad)	1.1 [a]	1.2	1.2	1.2	1.2	1.0	1.5	1.4
		M:F (Im)	-- [a]	1.2	1.2	1.1	1.2	1.2	1.2	1.3
Alberta	North	Total bag	--	176,900	375,200	418,300	373,900	408,800	363,900	469,600
		Im:Ad	--	1.7	6.3	4.2	3.5	2.7	1.9	4.1
		M:F (Ad)	--	1.2	1.0	1.3	1.3	1.0	1.9	1.6
		M:F (Im)	--	1.1	1.4	1.4	1.1	1.2	1.4	1.3
	South	Total bag	--	95,100	166,700	216,000	194,100	148,800	183,000	244,400
		Im:Ad	--	1.1	4.6	2.7	2.7	1.4	1.7	3.5
		M:F (Ad)	--	2.9	2.4	2.0	2.7	2.7	2.5	2.8
		M:F (Im)	--	1.4	1.3	1.7	1.2	1.6	1.4	1.5
	Combined	Total bag	387,600	272,000	541,800	634,300	568,000	557,600	546,900	714,100
		Im:Ad	3.6	1.4	5.7	3.6	3.2	2.2	1.9	3.9
		M:F (Ad)	1.1	1.6	1.4	1.5	1.7	1.4	2.1	1.9
		M:F (Im)	--	1.2	1.3	1.5	1.1	1.3	1.4	1.3
Saskatchewan	North	Total bag	--	15,100	22,500	6,700	125,800 [b]	120,600	82,400	136,100
		Im:Ad	--	2.6 [c]	5.5	9.5	3.0 [b]	2.0	2.4	4.5
		M:F (Ad)	--	- [c]	1.5	-	1.0 [b]	1.1	1.9	1.7
		M:F (Im)	--	0.9	1.0	1.6	1.4 [b]	1.1	1.2	1.2
	South	Total bag	--	175,300	363,800	680,500	405,900 [b]	357,300	266,700	363,500
		Im:Ad	--	0.9	3.6	3.9	2.2 [b]	1.4	1.6	2.1
		M:F (Ad)	--	2.7	2.6	2.6	2.4 [b]	2.4	3.5	3.5
		M:F (Im)	--	1.4	1.6	1.5	1.4 [b]	1.4	1.5	1.3
	Combined	Total bag	309,300	190,400	386,300	687,200	531,700	477,800	349,100	499,600
		Im:Ad	1.8	0.9	3.7	3.9	2.4	1.5	1.7	2.5
		M:F (Ad)	2.4	2.7	2.5	2.6	2.0	2.0	3.1	3.0
		M:F (Im)	--	1.3	1.5	1.5	1.4	1.3	1.4	1.3
Manitoba	North	Total bag	--	10,700	20,200	23,000	43,800	20,300	36,200	42,600
		Im:Ad	--	1.8	6.6	8.9	4.4	3.0	3.7	4.5
		M:F (Ad)	--	1.1	2.2	0.7	0.8	0.9	1.6	2.3
		M:F (Im)	--	1.0	1.3	1.4	1.0	1.2	1.1	1.6
	South	Total bag	--	132,400	261,100	287,300	154,200	194,200	101,300	102,500
		Im:Ad	--	1.2	3.6	4.8	2.4	1.8	2.3	2.3
		M:F (Ad)	--	1.4	1.5	1.0	1.3	1.0	1.4	1.3
		M:F (Im)	--	1.2	1.2	1.1	1.2	1.1	1.1	1.3
	Combined	Total bag	122,300	143,100	281,300	310,300	198,000	214,500	137,500	145,000
		Im:Ad	2.3	1.3	3.7	5.0	2.7	1.9	2.6	2.7
		M:F (Ad)	1.2	1.4	1.6	1.0	1.2	1.0	1.4	1.5
		M:F (Im)	--	1.1	1.2	1.2	1.1	1.1	1.1	1.4
Ontario	Combined	Total bag	255,000	244,000	228,900	213,900	223,800	254,200	255,400	257,200
		Im:Ad	5.7	5.8	6.1	7.6	5.7	4.4	6.5	4.3
		M:F (Ad)	0.7	0.8	0.8	0.7	0.7	0.7	0.7	0.7
		M:F (Im)	--	1.0	1.1	1.0	1.0	1.1	1.0	1.1
Quebec	Combined	Total bag	27,700	41,900	38,400	42,200	42,400	61,500	72,300	74,100
		Im:Ad	12.9	5.6	11.0	5.9	6.5	0.4	11.1	5.8
		M:F (Ad)	1.0	0.7	1.5	0.7	1.3	1.9	1.1	0.9
		M:F (Im)	--	1.2	1.1	1.0	1.1	1.4	1.1	1.1
Newfound-land	Combined	Total bag	400	500	100	0	0	400	100	300
		Im:Ad	--	-	-	-	-	-	-	-
		M:F (Ad)	--	-	-	-	-	-	-	-
		M:F (Im)	--	-	-	-	-	-	-	-
New Brunswick	Combined	Total bag	200	900	500	1,000	800	800	1,200	1,300
		Im:Ad	--	-	-	-	-	0.5	12.5	7.9
		M:F (Ad)	--	-	-	-	-	1.0	0.0	1.0
		M:F (Im)	--	-	-	-	-	-	1.6	0.6
Prince Edward Island	Combined	Total bag	200	200	200	tr.	400	100	400	200
		Im:Ad	--	-	-	-	-	-	1.3	0.5
		M:F (Ad)	--	-	-	-	-	-	2.0	1.0
		M:F (Im)	--	-	-	-	-	-	0.3	0.0
Nova Scotia	Combined	Total bag	600	300	900	700	700	800	1,200	500
		Im:Ad	--	-	-	-	-	2.4	3.9	1.8
		M:F (Ad)	--	-	-	-	-	4.0	0.6	0.6
		M:F (Im)	--	-	-	-	-	3.5	1.4	0.9
Total		Total bag	1,269,900	1,027,100	1,610,200	2,023,500	1,679,600	1,682,500	1,470,000	1,800,900
		Im:Ad	3.1	1.9	4.7	4.2	3.1	2.0	2.5	3.4
		M:F (Ad)	1.4	1.6	1.6	1.6	1.6	1.4	2.0	1.8
		M:F (Im)	--	1.1	1.3	1.3	1.2	1.2	1.2	1.3

a/ 1967-68 immature sex ratios not available from reports; no data available by harvest area this season.
b/ Area boundary changed this year.
c/ A dash (-) indicates that no figure is available, usually because samples are too small to yield meaningful ratios.

of Canadian Wildlife Service and Provincial surveys in some detail, reported 95% confidence limits of ±9.6%, ±5.2%, ±2.3%, and ±1.7%, respectively, for the 1965, 1966, 1967, and 1968 duck harvest estimates for British Columbia. In addition to the usual sampling error, however, various response and nonresponse biases can affect these survey results. Therefore, considered as a whole, the Provincial data summarized here (Table 17) are best viewed as harvest index values, indicators primarily of changes from year to year in an area and secondarily of differences between areas, rather than as measures of the actual size of the harvest at a particular time and place.

In these Provincial surveys, mallards appear to have made up a fairly uniform proportion of the harvest from year to year, so the trends evident in the total duck harvest probably apply to the mallard harvest fairly well. Some similarities can be noted between the fluctuations in these figures and those in mallard harvest figures for the United States (Table 6), but there are differences as well, and no very clear pattern emerges. However, these Provincial harvest figures may serve as a check against other mallard data (and vice versa). Both the Provincial and Federal surveys should be valuable independent sources of information for future analyses of North American waterfowl hunting and populations.

EFFECTS OF CERTAIN REGULATIONS ON HUNTER BEHAVIOR

Most of the data available for evaluating the effects of hunting regulations pertain to changes in waterfowl harvest or waterfowl populations. However, the initial impact of regulations is on hunter activity. The Hunter Performance Survey provides some data on hunter behavior as it relates to certain regulations, particularly bag limits. In this section, we discuss hunter compliance with these regulations and related effects on unretrieved kill and hunter selectivity.

Compliance with Bag Limits

Observations of illegal shooting of mallards during seasons with a one-mallard daily bag limit are summarized in Table 18, and one-mallard and two-mallard limits are compared in Table 19. The samples are small and their representativeness may be questioned, but the figures show clearly that the ability or willingness of hunters to comply with a one-mallard limit was very poor. Of the parties that had bagged their limit of mallards and had the opportunity to bag more, 73% continued to shoot at mallards and 33% killed more mallards. The lack of opportunity to shoot mallards reduced this illegal kill rate to 7% among all hunters, however, and the change to a two-mallard limit (Table 19) further reduced it to between 2 and 3%.

In 1967, no mallards were permitted in the bag during the first 10 calendar days of the duck season in southern Manitoba. According to Hunter Performance Survey work, somewhat modified from that described above (emphasis was on sampling partial hunts of many parties rather than complete hunts of a few parties), mallards made up about 19% of the ducks brought down during this period (Sorensen and Bossenmaier 1968). At least 82% of the hunter-parties under observation shot at one or more of the mallard flights in range and brought down birds from about 46% of the flights they shot at. Overall, hunters shot (illegally) at about 66% of the mallard flights in range. For comparison, in Ontario and eastward where no special restrictions were in effect on mallards, hunters shot at over 90% of the single mallards flying in range in 1968 and 1969 (Boyd 1971).

In general, when the limit on a common and desirable bird is sharply reduced within the total bag, the hunter's ability and willingness to comply with regulations appear to be severely stressed. The change from a complete closure on the mallard to a one-mallard limit relieves a substantial part of this pressure, and a further change from a one-mallard to a two-mallard limit is apparently enough to relieve most of the remaining pressure. The bag limit violation rate in the latter situation averaged only

Table 17. Summary of duck and mallard harvest index values obtained through the survey efforts of the various Canadian Provinces since 1950.

Hunting season	British Columbia		Alberta		Saskatchewan		Manitoba		New Brunswick
	Total ducks	Percent mallards	Total ducks	Percent mallards	Total ducks	Percent mallards	Total ducks	Percent mallards	Total ducks
1950-51	316,175	--[a]	364,400	65.5	275,970	--	--	--	21,900
1951-52	403,935	--	531,100	61.2	706,504	--	259,500	54.0	21,300
1952-53	349,629	--	680,700	59.7	928,261	--	273,700	53.5	23,561
1953-54	445,281	--	830,200	61.4	1,052,797	--	366,100	50.7	18,000
1954-55	428,425	--	907,100	61.7	1,120,252	--	334,800	49.9	15,798
1955-56	305,358	--	999,000	63.0	1,240,793	--	389,800	53.0	28,902
1956-57	319,809	--	904,500	59.5	1,269,130	--	548,400	56.8	22,226
1957-58	346,586	--	No survey		1,121,189	--	581,100	54.0	20,566
1958-59	432,120	--			737,033	--	471,800	55.4	37,000
1959-60	390,239	--			438,463	76.2	334,700	57.3	34,300
1960-61	390,004	--			754,510	79.5	460,200	62.1	61,000
1961-62	377,220	--			243,060	77.7	198,800	54.9	54,700
1962-63	460,539	--			170,435	80.7	177,300	68.5	60,700
1963-64	368,571	--			366,989	74.0	313,700	61.5	70,000
1964-65	383,961	--			279,033	73.4	394,700	59.0	37,788
1965-66	474,670	--			337,870	65.0	258,300	53.4	34,654
1966-67	491,493	36.6	569,600	63.7	427,219	60.0	--	--	27,961
1967-68	483,182	--	563,300	68.8	465,556	64.8	--	--	37,998
1968-69	381,819	--	No survey		300,806	65.3	--	--	57,272
1969-70	--	--			576,352	63.7	444,400	52.6	67,602
1970-71	--	--			822,285	70.0	484,200	51.9	63,926
1971-72	--	--			705,421	71.7	--	--	73,726
1972-73	--	--			507,232	71.4	--	--	64,037
1973-74	--	--			371,974	75.6	--	--	79,000
1974-75	--	--			612,947	72.8	--	--	65,800

[a] Items which were unavailable for this summary, usually because the information was not requested in the survey that year, are indicated by dashes (--).

Table 18. Hunter-party compliance with the one-mallard daily bag limit in the Central and Mississippi Flyways in 1965 and the Mississippi Flyway in 1968, based on the Hunter Performance Survey.

Hunter-parties:[a]	Number	Percent of A	Percent of D	Percent of E
A. Observed until hunt ended or bag violation occurred	230	100		
B. Having opportunity to shoot mallards	162	70		
C. Killing and retrieving mallards	131	57		
D. Reaching party's mallard bag limit	86	37	100	
E. Having opportunity to shoot more mallards	49	21	57	100
F. Shooting at more mallards	36	16	42	73
G. Killing more mallards	16	7	19	33

a/ Each entry is a subtotal of the previous entry.

Table 19. Comparisons of the percentages of hunting parties killing illegal ducks under a one-mallard and a two-mallard limit in the Mississippi Flyway, based on the Hunter Performance Survey.

State	Mallard limit during: 1965	1966	1967	1968	1969	Total parties[a] observed under mallard limit of: One	Two	Percent observed killing illegal ducks under mallard limit of: One	Two
Minnesota	1	2	2	1	1	3	2	0.0	0.0
Wisconsin	1	2	2	1	1	7	4	0.0	0.0
Michigan	1	2	2	1	1	8	5	0.0	0.0
Iowa	1	2	2	1	2	5	9	0.0	0.0
Illinois	1	2	2	1	2	19	7	15.8	0.0
Indiana	1	2	2	1	2	26	2	0.0	0.0
Ohio	1	2	2	1	1	5	10	40.0	0.0
Missouri	1	2	2	1	2	53	49	7.5	2.0
Kentucky	1	2	2	1	2	3	18	0.0	0.0
Arkansas	1	2	2	2	2	10	37	20.0	5.4
Tennessee	1	2	2	1	2	18	30	27.8	3.3
Louisiana	1	2	2	1	1	30	39	6.7	5.1
Mississippi	1	2	2	1	2	18	34	11.1	5.9
Alabama	1	2	2	1	2	29	18	13.8	0.0
Combined						234	264	10.3	3.0

a/ Excludes parties that were aware of being observed and parties having no opportunity to shoot at waterfowl.

about 3%, the same as when no special restriction is in effect.

Fixed-limit regulations containing restrictions on certain ducks require hunters to identify flying birds before shooting if they wish to achieve the bag limit and avoid bag limit violations. As such identification is comparatively difficult, mistakes are made, and thus accidental as well as intentional violations occur under this system. Few tests have been made of point-limit regulations which are considered to be of comparable restrictiveness; however, since the point system virtually eliminates accidental violations, the total violation rate under similar conditions should be lower. The very limited data of Mikula et al. (1972) tend to support this contention, but Hopper et al. (1975) present violation rates under the point system in a less favorable light, and, in view of current interest in this subject, we feel that some discussion here is in order.

The activities of individual hunters in the parties observed in the Hunter Performance Survey are usually not evident, so the hunter-party is the sampling unit, and, in the past, bag limit regulations have generally been analyzed on a hunter-party basis although they apply to individual hunters. For the analysis of point-limit data a new category was created for recording violations—parties in which a violation could have occurred—in an attempt to delimit the potential for reordering violations (Hopper et al. 1975). If all ducks taken by a party were assigned to a single hunter (with the high-point birds assumed to have been taken first), and that hunter would have been in violation of the bag limit, then the party was counted among the potential violators. Unfortunately, the comparatively high potential bag limit violation rates which result can only be compared to observed bag limit violation rates from the fixed-limit system, since potential violation rates have not been calculated for the fixed-limit system. If a comparable definition of a potential violation were applied to the fixed-limit system—the birds taken by a party were more than could have been taken legally by one hunter—the comparison would appear in a new light. For example, under a fixed-limit regulation of four ducks, two of which could be mallards, any party with more than two mallards or four ducks would appear among the potential violators. Similarly, if a limit of four ducks including one mallard were in effect, then any party with more than one mallard or four ducks would be in the potential violator category. Obviously, one would predict a much larger potential violator category in the second example although both are fixed-limit system regulations. High-point ducks are usually the same ones protected by low fixed limits, so the availability of ducks in the low-limit categories would be similar regardless of the bag limit system in effect.

It is believed to be common practice for hunters in parties to exchange ducks among themselves or even with other parties of hunters to assure that no individual appears to have violated the bag limit. Hunters frequently divide up their take simply with the idea of sharing, disregarding who shot which bird and under no pressure from bag limits, since usually no one hunter has taken, much less exceeded, his limit. There is no reason to believe that such exchanges would not continue under the point system, and shifting from the party to the individual hunter in analyzing point system data can produce very misleading results. Unless reordering is necessary to add a bird to the party bag (as opposed to an individual's bag), reordering is just a new name for the same old violation of trading birds. In such situations, reordering merely presents an alternative method of circumventing the limit and, as such, does not increase the violation rate. More insight into the potential problem of reordering might be gained by examining data on parties of one hunter, but such parties are in the minority and not typical of the average situation, so the results here could also be misleading. Unless much more sharply defined than in the past, the concept of potential bag limit violations appears to be of very limited usefulness and can, in fact, lead to erroneous conclusions.

Unretrieved Kill

Using the figures in Table 18 and assuming (1) an average party size of two hunters, (2) a legal unretrieved kill of 16%, and (3) that the mallards killed illegally were left unretrieved, we calculated that the illegal kill (disregarding illegal party hunting) made up a minimum of 6% of the mallards killed

by all 230 parties. The unretrieved kill rate for mallards thus increased from 16% to at least 21% with a one-mallard restriction. The unretrieved kill of other ducks should not have been affected, however, so the overall unretrieved kill rate must have been substantially less than 21%.

The Hunter Performance Survey also provides a basis for comparing unretrieved kill under the fixed-limit and point systems. Unretrieved kill rates for mallards under the point system regulations tested thus far do not differ significantly from those obtained under fixed limits (Table 20). Similarly, differences in unretrieved kill rates for all ducks (not shown) were not significant at the 95% level. Thus, although unretrieved kill rates under the variety of limit systems studied cannot be considered identical, the differences have been insignificant.

It should be recognized that the retrieval rate for the dull-colored mallard hens may be somewhat lower than for drakes even when regulations do not differ by sex. Consequently, it may not be appropriate to attribute the differences observed in the following situations entirely to the regulations in effect.

Under a point limit which puts a substantial point penalty on the taking of mallard hens, the unretrieved kill rate was significantly higher for hens than for drakes (Table 20). Similar results have been obtained under fixed limits with greater restrictions for hens than for drakes. During the 1967 San Luis Valley season (limit of six ducks per day provided at least four were mallard drakes), the unretrieved kill rate was decidedly higher for hens than for drakes (Hopper et al. 1975). A more extreme example (season open only on mallard drakes) was the High Plains season of 1968 (Table 13). However, a surprisingly high proportion of the illegally killed ducks, primarily mallard hens, were apparently retrieved and kept. This is strong evidence that even during a highly publicized season, a significant proportion of the hunters are uninformed or incorrectly informed about exactly what regulations are in effect, which further complicates attempts to analyze the effects of these regulations.

It is clear that differential regulations, whether under a fixed-limit or a point-limit system, can be expected to increase the unretrieved kill of those species and sexes of birds with the lowest bag limits if they are abundant enough to be encountered frequently by hunters. However, the resultant increase may vary widely from area to area depending on the regulation and the relative availability of each type of duck to hunters. Also, unretrieved kill rates may differ for different species or sexes of birds having the same number of points, just as for birds having the same limit under the fixed-limit system. Thus, when regulations are being enacted that put strong pressures on hunters to avoid certain birds and concentrate on others, the possible effects on unretrieved kill rates should also be carefully considered.

Hunter Selectivity

It is important that the relative (or differential) vulnerability of a species to hunting be clearly understood and carefully distinguished from hunter selectivity. The latter will be examined mainly in terms of its effects, effects that may be masked (abetted, cancelled, or even reversed) by those of relative vulnerability. Hunter selectivity is a hunter characteristic, whereas relative vulnerability is a characteristic of duck populations. As an example, Boyd (1971), examined the relative vulnerability to hunting of various ducks in eastern Canada by using Hunter Performance Survey observations of birds flying singly. He found that substantially more shots per bird were required to bring down large ducks (primarily mallards and black ducks) than to bring down medium-sized and small ones. Hunters brought down one-fourth to one-third of the large ducks they shot at, compared with more than one-half the other ducks. Unpublished figures from the Fish and Wildlife Service's Hunter Performance Survey tend to support these findings. Thus mallards, at least when flying singly, are substantially less vulnerable to shooting than most smaller ducks.

Whereas vulnerability is determined on the basis of shots actually fired, selectivity is based on the hunter's decision whether or not to shoot when an opportunity occurs. Under the point system regulations of 1970-1972 (Table 21), mallards in general were shot

Table 20. Comparisons of overall unretrieved kill rates for mallards during the 1965-1969 fixed-limit and 1970-1972 point-limit seasons in the 14 point-system States, and for male and female mallards during the point-limit seasons, based on the Hunter Performance Survey.

State	All mallards[a/]					Point-limit seasons				
	Fixed-limit		Point-limit		Difference between limit types (F - P = T)	Mallard drakes		Mallard hens		Difference between sexes (D - H = S)
	Total brought down	Percent lost (F)	Total brought down	Percent lost (P)		Total brought down	Percent lost (D)	Total brought down	Percent lost (H)	
New Jersey	6	16.7	38	10.5	6.2	25	12.0	11	0.0	12.0
Florida	23	26.1	16	31.2	- 5.1	6	16.7	8	25.0	- 8.3
Michigan	12	16.7	378	21.7	- 5.0	253	18.2	105	19.0	- 0.8
Iowa	13	7.7	634	19.2	-11.5	397	12.6	139	10.8	1.8
Illinois	55	10.9	613	15.7	- 4.8	378	10.6	155	15.5	- 4.9
Montana	52	25.0	163	22.7	2.3	141	19.1	18	33.3	-14.2
South Dakota	11	27.3	381	19.4	7.9	261	10.3	36	25.0	-14.7
Wyoming	16	6.2	159	12.6	- 6.4	115	7.8	26	15.4	- 7.6
Nebraska	89	22.5	411	10.7	11.8	293	7.2	57	17.5	-10.3
Colorado	59	11.9	367	15.5	- 3.6	272	10.3	68	22.1	-11.8
Kansas	136	14.0	48	20.8	- 6.8	32	6.2	10	20.0	-13.8
New Mexico	7	14.3	176	11.9	2.4	125	10.4	25	20.0	- 9.6
Oklahoma	70	15.7	148	8.8	6.9	120	5.8	18	11.1	- 5.3
Texas	77	15.6	246	19.9	- 4.3	157	14.0	44	6.8	7.2
Combined	626	16.5	3,778	16.8	- 0.3	2,575	11.5	720	16.2	- 4.7
	Analysis: $n = 14$; $\Sigma T = -10.0$; $\bar{T} = -0.71$; $\Sigma T^2 = 623.70$; $S_{\bar{T}} = 1.8406$; $t = -0.388$ for H_o: $\bar{T} = 0$.					Analysis: $n = 14$; $\Sigma S = -80.3$; $\bar{S} = -5.7$ $\Sigma S^2 = 1{,}324.13$; $S_{\bar{S}} = 2.1783$; $t = -2.633$* for H_o: $\bar{S} = 0$.[b/]				

a/ Includes birds not identified by sex.
b/ * indicates rejection of H_o with 95% confidence.

Table 21. Hunter selectivity with respect to the mallard in the 14 point-limit season States, 1970-1972, based on the Hunter Performance Survey.

		Hunting season				Combined drake:hen mallard ratio and interpretation
		1970-71	1971-72	1972-73	Combined	
Number of shooting opportunities (flights) recorded	Mallard drakes	1,119	1,153	915	3,187	Average of 1.8 drakes available per hen.[a/]
	Mallard hens	476	714	562	1,752	
	Total mallards	1,595	1,867	1,477	4,939	
	Total ducks	4,327	4,849	4,238	13,414	
Percent of one-sex mallard flights shot at	Mallard drakes	95	93	94	94	Drakes 1.3 times as likely to be shot at as hens when in separate flocks.
	Mallard hens	73	72	73	73	
Birds brought down per shooting opportunity [b/]	Mallard drakes	0.703	0.657	0.607	0.659	Drakes 1.7 times as likely to be shot as hens (separate and mixed flocks combined).
	Mallard hens	0.400	0.391	0.346	0.378	
	Total mallards	0.612	0.555	0.507	0.559	
	Total ducks	0.617	0.555	0.495	0.556	
Total number of birds brought down by hunters in the sample [b/]	Mallard drakes	786	758	555	2,099	Average of 3.2 times as many drakes shot as hens under the conditions represented by these observations.
	Mallard hens	190	279	194	663	
	Total mallards	976	1,037	749	2,762	
	Total ducks	2,669	2,691	2,098	7,458	

a/ The average for all flocks was the same as for single-sex flocks.
b/ Corrected for upward-biased kill rates obtained when using only identified flights.

at and killed in the same proportions as other ducks (averages of 0.56 bird brought down per opportunity). The decrease in this ratio each year probably reflects an increase in observer skill rather than a change in hunter behavior.

The averages in Table 21 indicate that, with about 1.8 drakes available per hen, separate flocks of mallard drakes were about 1.3 times as likely to be shot at as flocks of hens. For all flocks, drakes were about 1.7 times as likely as hens to be brought down. Assuming that the ratio between birds shot at and birds brought down is essentially the same for drakes and hens (no differential vulnerability), the difference between 1.3 and 1.7 must mean that hunter selectivity for drakes from flocks of mixed sexes was substantially greater than 1.7. This is reasonable because the decision not to shoot when a flock of hens goes by is undoubtedly much harder to make than the decision not to shoot at a hen when a flock contains both drakes and hens. About 4.0 times as many drakes as hens were killed from mixed (and incompletely identified) flocks and, since there were an average of 1.8 drakes per hen in both mixed and single-sex flocks, drakes in mixed flocks were about 2.2 times as likely to be shot as hens due to hunter selectivity. Since drakes are probably more recognizable then hens (the ratio of 1.8 drakes per hen seems rather high), a lower ratio might be more realistic for mixed flocks, in which case hunter selectivity for drakes in mixed flocks would have been even greater than 2.2.

Unfortunately, few measurements of hunter selectivity for mallard drakes and hens during a typical fixed-limit season are available for comparison with these point season figures. The principal information comes from recent studies in Michigan. On the Shiawassee River State Game Area in 1969, three regulations were compared: (1) a point system in which the daily limit was 60 points, mallard drakes were 20 points, and hens 60 points; (2) a fixed daily limit of two ducks with no species or sex restrictions; and (3) a fixed daily limit of four ducks including no more than one mallard, the regulation in effect in the rest of Michigan and four other Mississippi Flyway States that season (Mikula et al. 1972). Hunter selectivity was 1.7 drakes per hen under the point system, (similar to the average in Table 21 for all areas and mallard flocks) and 1.1 drakes per hen under each of the systems not regulating by sex. In 1970, two different versions of the point system were tested; in each, the daily point limit was 100 and mallard hens were 90 points, but mallard drakes were 70 points in one version and 20 points in the other (Mikula et al. 1971). Where drakes were 20 points, hunter selectivity was 1.5 drakes per hen, but where drakes were 70 points, selectivity was only 1.2 drakes per hen. It appears that the average hunter's natural tendency is to be relatively unselective in shooting at mallard drakes and hens, but that varying degrees of selectivity can be readily induced through the use of hunting regulations that encourage it.

EFFECTS OF HUNTING REGULATIONS ON THE MALLARD HARVEST

A goal of most management programs for game species is to make high-quality recreational hunting equally available to everyone on a long-term basis, implicit in which is the maintenance of healthy populations of each species. Great effort goes into formulating hunting regulations which will accomplish this—the maximization of recreation and harvest over the long term. How important the various elements of these regulations are in meeting these goals has been the subject of long, sometimes heated, debate. Of course, the effects of a particular regulation often differ from area to area and from year to year, apparently due primarily to variations in characteristics of duck populations and, to some extent, hunters. Most people therefore agree that, to be equitable, regulations must also differ and must change in timely response to changing circumstances. Most of the argument comes about at this point and involves the question of what differences and changes, if any, are appropriate in a particular situation.

It is very difficult to separate the effects of changes in the various hunting regulations from each other and from the effects of other changes affecting duck hunting activity and success. When smaller duck flights are expected during an upcoming hunting season, regulations are generally made more restrictive, and when larger flights are forecast, they are made more liberal. Thus each year variables such as the bag limit, season length, and numbers of waterfowl, waterfowl hunters, and waterfowl harvested tend to be correlated, but the distinction between independence and dependence is imperfect. Hunter activity and success are dependent, whereas hunting regulations and natural factors tend to be interdependent. Thus clearcut cause-and-effect relationships are absent, and the existing relationships are complex and poorly understood, though there are many hypotheses about them.

These unproven and perhaps unprovable hypotheses are often at the center of the arguments about regulations. While no final solutions are offered here, we hope the material to follow will result in more light and less heat in future deliberations about regulations. In this section, harvest survey data on the effects of certain regulations are presented and discussed, followed by some theoretical evaluations that permit broader application of these results for predicting the effects of various regulations and comparing their effectiveness in achieving management objectives.

Observed Effects of Various Regulations

Starting Time on Opening Day

In some years the starting time on the first day of the duck season has been noon under Federal law whereas in other years it has been sunrise or ½ hour before sunrise in most States (Table 2). To determine if this difference affected hunter success, Hunter Questionnaire Survey data relating to daily hunting success were tabulated for 1962 and 1963, when the season opened at noon, and for 1964, when it opened at sunrise or ½ hour before.

Many factors other than starting time can be expected to affect daily hunting success. These include the date and the day of the week on which the season opens; split seasons; the prohibition on Sunday hunting in some States; the restrictions on weekday hunting in California; and the differing size, composition, and migration pattern of the duck population from year to year. Therefore, for this examination, States were grouped each year by the day of the week on which their season opened; only the first 14 days of the season were examined, to reduce the influence of yearly differences in duck populations and migration; States with split seasons involving these first 14 days were excluded; California was excluded; States imposing a noon starting time in 1964 were excluded from that year's figures; and adjustments were made for States prohibiting Sunday hunting.

One consequence of these steps to reduce the effects of extraneous variables was that the number of

States available for examination, already quite small, particularly for weekday openings, was reduced even further. However, consistencies in overall hunting success were still evident, and these are illustrated for seasons opening on Wednesdays, Fridays, and Saturdays in Fig. 8. General hunting regulations in 1963 and 1964 were very similar, and considerably more liberal than in 1962 (Table 1), so these 2 years provide the best comparisons. If the starting time on opening day affected daily success, this effect should be strongest during the first few days of the season, and curves for 1964 should not parallel those for 1963 or 1962. Inspection of Fig. 8 reveals no consistent differences in the curves for these 3 years that might be a reflection of the different starting times.

Since these were pooled data, the possibility that variability among States was masking starting-time effects was investigated. Daily success was compared for each State that opened the same day of the week in consecutive years. Again, no differences were found that could be attributed to different starting times. We tentatively conclude that starting time on opening day had no effect on the level of hunting success on opening day or on day-to-day hunting success the next 13 days (or that the effect was so small as to escape notice among the effects of other variables).

Starting times undoubtedly have other effects, however. Several general rules are evident in most waterfowl harvest data: (1) hunter success is almost always higher on opening day, regardless of the day of the week, than on any other day of the season; (2) success decreases most rapidly just after opening day but soon tends to stabilize at a lower level, so that the season average is substantially less than the opening day average; and (3) under most circumstances, the number of hunters afield is greatest on opening day, being highly concentrated into 2 days when the 2nd day is a Sunday and more evenly divided between opening day and the following Saturday and Sunday when opening on a weekday. It follows from these characteristics that hunting pressure on opening day plays a major role in determining total seasonal activity and success. In general, fewer hunters can be expected to go out on opening day when a season opens at noon, and those who go out will spend fewer hours afield. Thus a noon starting time will tend to reduce average and total seasonal success.

Shooting hours on opening day appear to be related to the day of the week selected for opening in a number of States. Only 20 States selected a weekend-noon opening in 1962 and 26 in 1963, but 36 States chose a weekend-early morning opening in 1964. A weekday-noon opening might be expected to reduce average seasonal success even more than a noon opening by itself, since both factors work to reduce hunter participation on opening day. Of course, if a weekday opening resulted in a somewhat flatter success curve, and if this curve leveled off at a higher level than the curve for a weekend opening, the initial effect of a weekday opening might be offset or even reversed. However, available evidence suggests that the curves stabilize at the same level regardless of opening day, so the lower daily success at the start would be the controlling factor for a season with a weekly opening. It does not rule out the possibility that a noon starting time distributes the bag more evenly among hunters, but Questionnaire Survey data indicate that this does not occur. The proportion of the potential waterfowl hunters bagging one or more ducks was 59% in 1963 and 62% in 1964, and 75% of the ducks bagged were taken by about 22% of the hunters in both years.

Thus, while starting time on opening day appears to have little or no effect on average day-to-day hunting success or on the distribution of the bag among hunters, there is strong evidence, both direct and circumstantial, that a noon starting time, particularly on a weekday, will tend to reduce both average and total hunter success during a season.

Day of the Week of Opening Day

Insufficient data are available relating to the choice of opening day to permit comparisons among individual days of the week, but weekend and weekday periods can be compared.

Many hunters have obligations which restrict their opportunity to hunt on weekdays, so weekday openings, like noon starting times, can be expected to reduce hunting activity on opening day by reducing the total numbers of hunters afield, their average number of hours afield, and thus their average and total success that day. Since hunting on opening day is an important component of seasonal participation and success in most areas, a weekday opening can thus be expected to result in lower seasonal activity

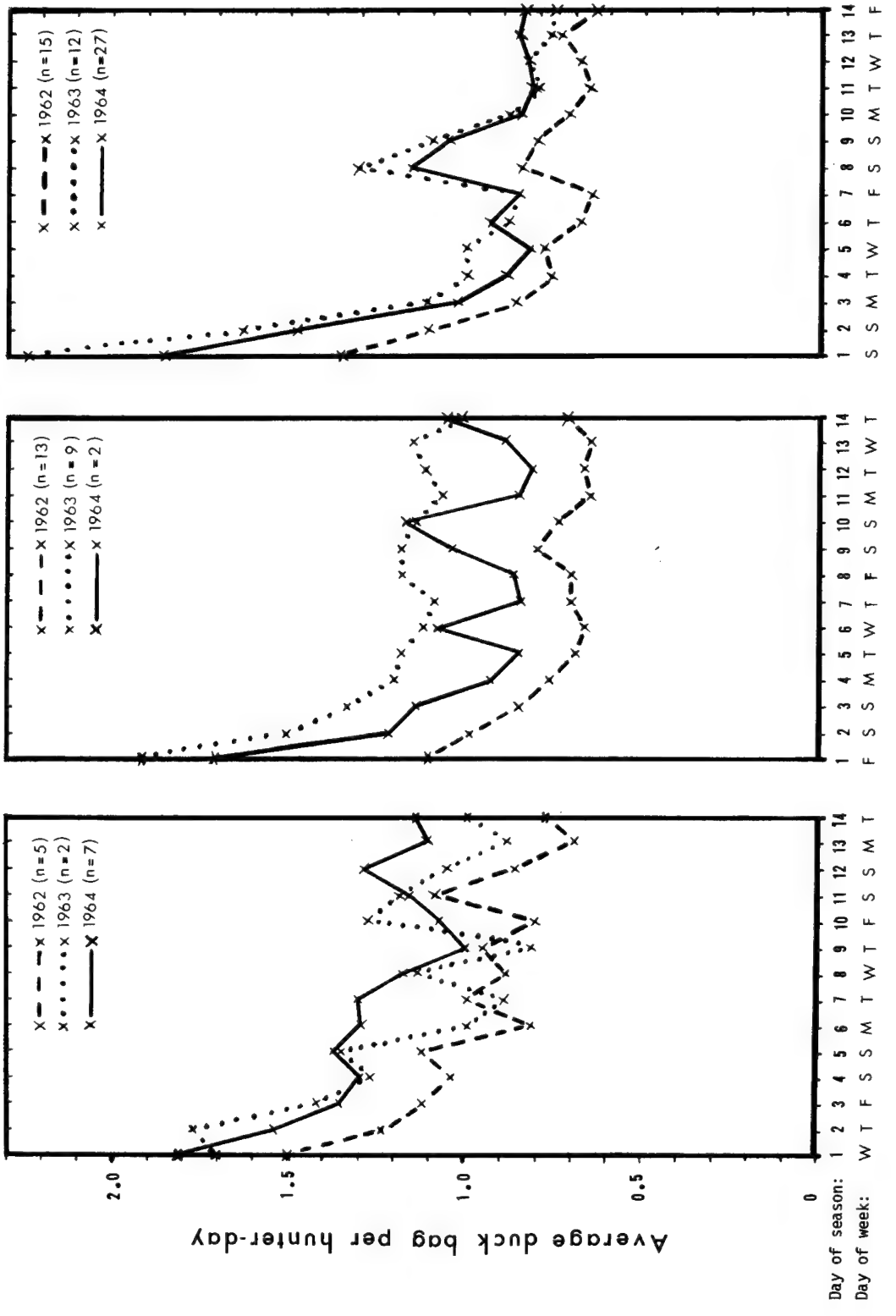


Fig. 8—Profiles of daily duck hunting success (ducks bagged per hunter per day) during the first 14 days of the duck season for States opening their seasons on a Wednesday, Friday, or Saturday in 1962 and 1963 (noon opening on first day) and in 1964 (opening at sunrise or before).

and success than would a weekend opening, other conditions being equal; affects on average daily success, if any, should involve mainly opening day.

Some of these expected relationships are apparent in the data from the experimental San Luis Valley season (Table 22) and others are not. This season had somewhat fewer changes from year to year in its regulations than most other seasons (e.g., season dates were always 1-18 October) and it is therefore the best source of information on some of these relationships, even though it was not a typical season in many respects. Success was almost always highest on opening day in the San Luis Valley, as has been true elsewhere, but there is no indication that weekday openings were associated with lower average success on opening day. The fact that the 2 years when the season opened on a weekend were also the years when shooting hours ended at noon (Table 5), and the fact that this season attracted a high proportion of its hunters from outside the Valley ("big city" hunters) probably have some bearing on these results. Hunting pressure on opening day in the San Luis Valley appears to have been about twice as heavy when the season opened on a weekend (averaging 31% of the hunter-days and 38% of the duck bag) as when it opened on a weekday (averaging 15% of the hunter-days and 23% of the duck bag). However, 60 to 67% of the hunter-days and 66 to 74% of the duck harvest occurred during the first 7 days of the season, rather narrow ranges with similar averages for weekend and weekday openings. This indicates that there were no important differences in the distribution of either hunting activity or success between the first 7 and the last 11 days of the season due to the choice of opening day. The main effect was that hunting activity and success, during the first 7 days, were markedly affected by this choice being concentrated into 1 or 2 peak days with a weekend opening, and spread much more evenly over 3 or 4 peak days with a weekday opening.

An attempt was made to examine the regular season data on a similar basis. However, with longer seasons and more variable duck populations and migration patterns involved, the results become less predictable, and the pattern evident during the San Luis Valley season becomes more obscure. The same general principles would appear to apply, however. Generally, it appears that a weekday opening tends to reduce hunting pressure on opening day and spread it among several other days early in the season. Such a shift should result in lower seasonal success even if the total number of participants and their time afield do not decrease.

In 1974, some States accepted the option of a season 5 days longer provided that it opened at noon on Wednesday. Kennedy et al. (1974) concluded from bag check data that in Illinois the midweek opening did not appreciably reduce hunting pressure on the first weekend, that it apparently resulted in greater total hunting pressure and harvest during the first 5 days, and that therefore the season probably was more liberal than one opening on a weekend, especially when the latter would have been 5 days shorter. Thus, like opening-day success figures in the San Luis Valley, these results appear to contradict expectations. On the other hand, R. L. Jessen (personal communication) felt that Minnesota's Monday opening in 1973 contributed substantially to the decrease in hunter activity and success there that season. All this serves to re-emphasize that regulations typically produce a range of results, some varying widely from the "average" result.

Date of Opening Day

Manipulation of the starting time and day of the week for opening day influences the duck harvest primarily by affecting hunter activity. Since the characteristics of the duck population change over time, manipulation of the date of opening day would appear to be a more versatile management tool for regulating harvest because both hunter characteristics and chronology of migration can be used to advantage.

Benson et al. (1957) used fall aerial survey data and bag check records to evaluate opening date and season length in New York, but their method, based on the chronology of migration, does not estimate changes in harvest quantitatively. It is somewhat hazardous to use chronological harvest data of the type available here (Tables 8 and A-14) to predict how the harvest would be affected by changing such a major component of regulations as season dates, because if earlier events had been altered, later events might not have followed the pattern shown. On the other hand, the data on chronology were gathered over a period of years and contain the effects of early,

Table 22. Daily activity and success during the experimental San Luis Valley season, 1963-1970, based on Hunter Questionnaire Survey data.

	Date: October	Year 1963	1964	1965	1966	1967	1968	1969	1970
	1st	19.0	24.3	25.3	38.2*	38.6*	23.4	24.1	24.1
	2nd	11.5	19.6	21.6*	26.0*	11.8	11.2	14.2	15.8
	3rd	4.4	14.1*	13.5*	2.4	1.9	3.5	5.2	18.1*
	4th	3.5	10.3*	1.6	1.7	1.4	3.3	17.1*	11.1*
Percent	5th	13.0*	2.3	1.6	1.3	1.4	18.0*	10.3*	1.6
	6th	12.9*	1.7	1.0	1.0	1.2	13.4*	1.4	1.5
of	7th	1.7	2.0	1.8	1.0	11.9*	1.5	1.9	1.3
	(1st-7th)	(66.0)	(74.3)	(66.4)	(71.6)	(68.2)	(74.3)	(74.2)	(73.5)
duck	8th	1.6	2.0	2.0	9.0*	12.1*	1.7	0.9	1.6
	9th	1.7	2.8	8.5*	8.0*	1.5	1.5	2.5	2.3
bag,	10th	2.3	6.3*	9.0*	0.8	1.1	1.4	2.8	8.1*
	11th	2.0	6.1*	1.8	0.6	1.3	1.8	8.5*	6.4*
by	12th	8.4*	1.0	1.7	0.7	0.7	9.3*	4.5*	0.6
	13th	10.0*	1.0	1.6	0.4	1.0	6.1*	0.8	0.4
date	14th	1.0	0.6	0.6	0.7	6.5*	0.5	0.7	0.6
	15th	1.3	0.2	0.9	3.7*	5.8*	0.6	0.6	0.8
	16th	1.3	0.7	2.8*	3.5*	0.4	0.8	0.2	1.1
	17th	1.5	3.1*	3.7*	0.7	0.6	1.1	1.7	2.5*
	18th	2.9	1.9*	1.0	0.3	0.9	0.9	2.5*	2.1*
	Total	100.0	100.0	100.0	100.0	100.1	100.0	99.9	100.0
	1st	13.6	15.4	16.9	28.9*	32.7*	13.7	14.9	15.5
	2nd	9.5	12.7	18.9*	25.9*	9.8	7.8	10.0	12.1
	3rd	4.4	15.0*	14.6*	2.8	2.5	3.1	5.1	18.3*
	4th	4.6	11.3*	2.7	2.1	1.9	3.7	18.3*	13.8*
	5th	13.0*	2.7	3.1	1.8	1.7	18.2*	14.4*	1.8
Percent	6th	12.4*	2.7	2.1	1.2	1.6	15.7*	1.8	1.8
	7th	2.3	3.5	2.2	1.2	12.6*	2.2	2.4	2.0
of	(1st-7th)	(59.8)	(63.3)	(60.5)	(63.9)	(62.8)	(64.4)	(66.9)	(65.3)
	8th	3.1	3.1	2.4	10.7*	13.7*	2.2	1.8	1.9
hunter-days,	9th	2.9	3.4	9.3*	10.0*	1.1	1.8	3.4	3.2
	10th	2.6	7.7*	9.7*	1.0	1.2	2.2	3.5	9.4*
by	11th	3.3	8.4*	2.1	0.9	1.9	3.6	10.3*	7.4*
	12th	8.5*	1.5	1.5	1.1	1.1	11.3*	5.8*	1.3
date	13th	8.7*	1.9	1.8	0.9	1.2	8.9*	1.3	0.8
	14th	1.3	1.0	1.4	1.0	7.3*	0.9	0.9	1.0
	15th	1.7	0.9	1.5	4.7*	7.2*	0.9	1.1	1.4
	16th	2.2	1.5	3.7*	4.5*	0.6	1.2	0.6	1.8
	17th	2.4	4.3*	4.7*	0.7	0.9	1.3	1.8	3.5*
	18th	3.3	3.0*	1.4	0.5	1.1	1.4	2.5*	3.0*
	Total	99.8	100.0	100.0	99.9	100.1	100.1	99.9	100.0
	1st	3.3	3.4	3.7	3.5*	2.7*	3.2	3.3	3.7
	2nd	2.8	3.0	2.7*	2.7*	2.8	2.7	2.9	3.1
	3rd	2.3	2.2*	2.3*	2.4	1.7	2.1	2.0	2.4*
	4th	1.8	2.2*	1.7	2.1	1.7	1.7	1.9*	1.9*
Ducks	5th	2.3*	1.7	1.3	2.0	1.9	2.0*	1.4*	2.0
	6th	2.4*	1.5	1.3	2.4	1.7	1.6*	1.6	1.9
bagged	7th	1.7	1.6	1.9	2.5	2.2*	1.3	1.6	1.6
	8th	1.2	1.5	2.1	2.3*	2.1*	1.4	1.0	2.0
per	9th	1.4	1.7	2.2*	2.2*	3.1	1.6	1.5	1.7
	10th	2.1	1.7*	2.3*	2.4	2.5	1.2	1.6	2.1*
hunter-day,	11th	1.4	1.6*	2.1	1.7	1.6	0.9	1.7*	2.1*
	12th	2.3*	1.4	2.6	1.8	1.5	1.5*	1.6*	1.1
by	13th	2.7*	1.3	2.2	1.1	1.8	1.3*	1.3	1.2
	14th	1.7	1.9	1.2	1.8	2.1*	1.1	1.5	1.4
date	15th	1.8	0.7	1.7	2.1*	1.9*	1.4	1.1	1.3
	16th	1.4	1.2	1.9*	2.0*	1.8	1.3	0.8	1.4
	17th	1.4	2.1*	2.0*	2.5	1.8	1.7	1.9	1.7*
	18th	2.0	1.8*	1.7	2.0	1.9	1.2	2.0*	1.7*
	Total	2.3	2.3	2.7	2.6	2.2	1.8	2.1	2.3

* Denotes weekend days

late, long, and short seasons, and certain patterns still persist. For this reason, we believe they provide a valid basis for the following generalizations.

In most places, the incidence of mallards and other ducks in the harvest changes predictably through the hunting season. Within limits, in States where the proportion of mallards and other late migrants in the harvest increases during the season (e.g., North Dakota, Texas, Illinois), earlier opening and closing dates should decrease hunting pressure on them, but the pressure on such ducks as blue-winged teal, wood ducks, and mottled ducks would be expected to increase. Conversely, where the proportion of mallards decreases through the season (e.g., California and mainland New York) earlier dates should increase the relative size of the harvest of mallards and early migrants but decrease that of late migrants. In each situation, of course, later opening and closing dates would have the opposite effect. In some areas, possibly including Minnesota and Wisconsin, a change in dates would probably produce little or no change in the incidence of mallards in the harvest, although proportions of early and late migrants would be affected. However, in such States an earlier season would increase the harvest of locally breeding birds, whereas a later season would shift hunting pressure to migrants. Thus, careful consideration of a number of factors is advisable in setting season dates.

Of course, the choice of season dates can affect the total size as well as the composition of the harvest. Shifting the opening date to a period when fewer ducks are present should decrease the total harvest for a season, and vice versa. The timing of migration is the key factor. Note also that changing the opening date by a week in a northern State where most birds are local breeders or migrants might have a more drastic effect than changing it by a month in a southern State where wintering birds are important in harvest.

The age and sex compositions of the mallard harvest also tend to change predictably through the season with later seasons being characterized by lower age ratios and somewhat higher proportions of adult males than early seasons. Since natural mortality should be higher for inexperienced young birds than for adults, even without hunting, the relative number of immature birds in the harvest should be lower (perhaps only slightly lower) during late seasons than during early ones. Since differential migration seems to importantly affect the vulnerability of adult males, their occurrence in the harvest may be more sensitive to the particular combination of States and season dates involved.

Season Length

A change in season length is one of the most frequently used devices for regulating waterfowl harvest, but its effectiveness can be highly variable, as indicated by Duck Wing Survey data on the chronology of the harvest. Such data are summarized in Table 23 for the more important mallard harvest States and representative portions appear in Fig. 9. The harvest within a State tends to show the same chronology from year to year, so average figures are used for each State for this rather general evaluation. These averages can be calculated in several ways, which affects the weight given each year's figures and thus the averages themselves, but the same general pattern of seasonal distribution emerges regardless of such minor mathematical differences.

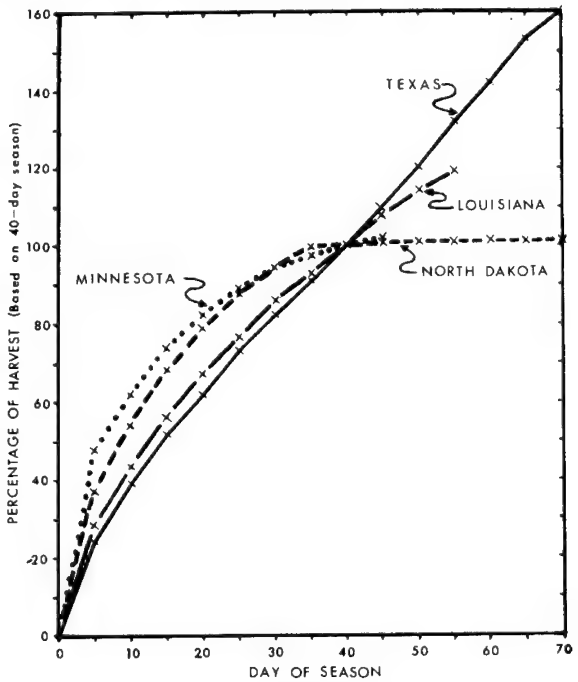


Fig. 9.—Average chronological distribution, in 5-day increments, of the duck harvest in selected States, 1961-1970.

To facilitate comparisons among States, harvest figures for ducks and mallards are shown as cumulative percentages based on a standardized

Table 23. Average chronological distribution, in 5-day increments, of all ducks (D) and mallards (M) bagged in selected States and areas, based on Duck Wing Survey data, 1961-1970.

States and areas	Bag of:	Percentage of 40-day harvest occurring from opening day through day n where n is:																				
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
Alaska	D	39	51	61	67	74	83	92	100	106	111	118	120	122	124	124	125	126	126	127	127	127
	M	36	47	54	60	66	75	90	100	114	127	144	149	153	156	158	160	160	162	164	165	165
Pacific Flyway																						
Washington[a]	D	34	46	54	61	69	79	90	100	111	121	129	136	143	151	157	163	170	174	178		
	M	32	43	51	58	67	76	88	100	113	124	134	142	151	160	167	174	183	187	191		
Oregon[a]	D	29	40	50	59	69	79	90	100	111	122	131	141	150	160	170	178	185	191	197		
	M	30	41	48	59	67	77	89	100	113	126	138	149	158	169	180	189	197	205	211		
Idaho[a]	D	34	47	57	64	66	78	88	100	106	116	127	138	150	163	176	187	202	211	220		
	M	33	46	55	62	68	78	90	100	111	123	138	153	169	186	202	218	237	246	256		
California	D	29	42	52	64	73	82	87	100	110	118	130	140	149	159	170	182	196	202	206		
(Areas 2 and 3)	M	26	38	49	61	72	82	91	100	108	116	126	135	143	151	159	170	181	186	189		
Nevada	D	47	59	68	75	81	87	94	100	106	112	117	123	128	133	138	142	147	149	154		
	M	49	61	68	74	80	86	93	100	108	114	121	128	135	141	147	152	159	162	167		
Utah	D	54	64	70	75	80	86	93	100	105	111	116	120	125	129	132	136	140	142	150		
	M	58	68	73	76	80	86	93	100	105	111	116	122	131	138	145	152	160	167	184		
Arizona	D	27	39	52	61	70	80	90	100	111	123	134	145	159	170	179	191	201	211	222		
	M	43	50	55	59	64	72	82	100	126	152	182	221	256	294	323	347	375	400	429		
Central Flyway																						
North Dakota	D	37	54	68	79	88	94	99	100	101	101	101	101	101	101							
	M	31	47	61	74	84	92	98	100	102	102	102	103	103	103							
South Dakota[b]	D	34	49	62	72	81	89	95	100	105	108	111	112	113	114							
	M	27	39	51	62	75	82	91	100	109	115	119	121	124	124							
Nebraska[b]	D	27	42	54	68	76	86	93	100	107	114	121	130	140	148							
	M	12	22	34	47	66	79	90	100	113	125	137	149	162	176							
Colorado	D	26	42	56	68	79	88	94	100	105	110	115	122	128	132	135	144	153	161			
(Area 3)	M	22	36	49	62	74	85	94	100	105	111	118	125	132	137	141	154	167	177			
Kansas	D	31	50	64	76	85	92	97	100	102	106	107	111	112	114							
	M	16	31	44	58	72	84	94	100	106	114	119	128	132	138							
Oklahoma	D	23	37	54	69	79	88	95	100	108	113	118	123	128	133							
	M	11	19	33	49	64	77	88	100	117	127	137	147	158	168							
Texas	D	24	39	52	62	73	82	91	100	110	120	132	142	153	161							
	M	20	34	48	59	71	81	91	100	109	119	133	147	161	172							
Mississippi Flyway																						
Minnesota	D	48	62	74	82	89	94	97	100	102												
	M	48	62	73	82	89	93	97	100	104												
Wisconsin	D	42	58	68	79	86	92	96	100	101	102	103										
	M	40	57	69	79	86	91	96	100	102	102	103										
Michigan	D	39	54	66	76	84	90	96	100	103	106	112										
	M	45	61	73	82	88	92	96	100	105	108	113										
Iowa	D	39	55	68	77	84	90	95	100	106	112	117										
	M	25	38	51	62	72	82	91	100	111	126	138										
Illinois	D	33	50	62	73	82	89	95	100	106	110	114										
	M	26	42	55	66	76	86	93	100	106	113	117										
Indiana	D	38	53	65	76	84	91	96	100	105	109	112										
	M	27	41	53	66	75	85	94	100	106	111	119										
Ohio	D	38	52	63	72	80	87	94	100	107	120	125										
	M	33	47	60	69	78	86	93	100	112	123	140										
Missouri	D	25	40	55	67	77	86	94	100	104	108	112										
	M	16	29	42	55	68	80	91	100	109	115	121										
Kentucky	D	16	26	38	48	62	75	86	100	112												
	M	17	27	39	49	65	78	88	100	113												
Arkansas	D	25	40	52	62	71	81	90	100	109												
	M	24	38	49	59	69	79	90	100	110												
Tennessee	D	21	32	43	53	64	76	86	100	115												
	M	18	29	39	49	61	73	85	100	117												
Louisiana	D	28	43	56	67	77	86	92	100	108	114	119										
	M	25	40	53	65	76	85	93	100	108	117	123										
Mississippi	D	25	39	51	64	74	85	92	100	110												
	M	22	36	49	60	70	83	92	100	113												
Alabama	D	26	38	49	59	70	79	89	100	112	120	137										
	M	19	31	42	53	64	74	85	100	122	134	156										
Atlantic Flyway																						
New York	D	47	62	72	79	85	90	95	100	105	111	115	118									
(Mainland)	M	56	72	80	86	90	94	97	100	103	106	107	107									
New York	D	23	36	47	59	69	79	90	100	111	125											
(Long Island)	M	30	46	58	69	78	84	93	100	108	119											
Pennsylvania	D	49	64	73	80	85	91	96	100	103	108	113	115									
	M	51	66	75	81	86	92	98	100	104	109	113	117									

a/ Excludes hunting in Columbia Basin area of State following close of regular season elsewhere.
b/ Excludes 20-day extension of season in High Plains area of State in 1970.

season length of 40 days. Both Tables 23 and A-14 provide an indication of the manner in which the duck harvest is distributed through the season and of changes in the incidence of mallards in the harvest during the season, but Table 23 is designed specifically for examining certain effects of season length on harvest.

The figures in Table 23 can be used to examine the changes in the harvest of ducks and mallards which have resulted from various changes in season length. For example, in Tennessee, lengthening the season from 35 to 40 days appears to increase the mallard harvest an average of 18% ([100% ÷ 85%] - 100% = 18%) while shortening the season from 40 to 35 days results in a decrease of 15% ([85% ÷ 100%] - 100% = -15%).

Since the chronology of the harvest tends to be similar in groups of neighboring States, an examination of Table 23 also reveals some regional patterns. The greatest differences are found between certain northern areas and areas farther south. As portrayed graphically in Fig. 9 for several States, seasons longer than about 35 days increase harvests very little in States like North Dakota, Minnesota, and Wisconsin, but harvests increase substantially as season length increases in many others, most notably Nebraska, Oklahoma, Texas, Ohio, and the States in the Pacific Flyway. Further, with a few exceptions, among which California and New York stand out, these additional days often produce greater increases in the mallard harvest than in the harvest of other ducks. Choice of season length should therefore involve balanced consideration of management goals for both mallards and other ducks.

Grieb (1960) used questionnaire data from hunters to evaluate the effects of changes in season length in the Central Flyway States. His figures showed that additional days are more important, much more important in some States, than the values in Table 23 indicate. Since wing survey data are believed to be weighted toward the earlier part of the season and questionnaire data toward the later part, the actual effect is probably somewhere between, with the values in Table 23 serving as a lower limit and Grieb's figures serving as an upper limit.

The Split Season Option

A State sometimes wishes to split its duck season into two periods to take advantage of separate peaks in waterfowl migration or to better satisfy residents of different areas who want to hunt during the period of peak waterfowl population in their part of the State. Until 1970, States that split their season were also required to shorten it (Table 1). Since the split season was usually designed to increase the harvest as well as to better distribute it, this penalty was applied to hold total harvest at about the same level as a continuous season would have achieved. Unpublished Duck Wing Survey data compiled by M. G. Smart (U.S. Fish and Wildlife Service) in 1964 indicated that split seasons 10% shorter than continuous ones produced, not an equivalent harvest, but one averaging 16% larger. This difference was quite variable, however, and changing some of the assumptions made in the analysis can change the results. For example, this occurred when the approach used to examine the effects of changing season length (Table 23) was adapted to a comparison of split and continuous seasons in 14 States unaffected by special seasons during 1961-1970 (Table 24). Increases in harvest were associated with split seasons in seven instances and decreases occurred in seven (compare the continuous season total with that for a split season approximately 10% shorter or, where yearly variations in season length preclude this, compare the split season total with that for a continuous season about 11% longer). This result seems to indicate that a split season could reduce harvest as readily as increase it.

Neither of these approaches to the analysis of split season effects is entirely satisfactory as each involves several rather weak assumptions, but they do serve to demonstrate the complexity of this subject. The results of selecting a split season are apparently rather unpredictable, and, as with so many other regulations, can be expected to vary from State to State and year to year. Related conditions, such as migration dates, are more predictable in some States than others, and some States should thus be more consistently successful than others in selecting split seasons that maximize hunter recreation and harvest. In general, the effects that splitting a season will have on the species, age, and sex compositions of the harvest will depend on the combination of opening dates and season lengths selected.

Table 24. Comparison of the effect of split (S) and continuous (C) seasons on the average chronological distribution and relative size of the duck harvest in selected States and areas, based on Duck Wing Survey data, 1961-1970.

States and areas	Season type	Number of years	Percentage of the 5-day harvest occurring from opening day through day n where n is:																	
			5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
Pacific Flyway																				
California	S	2	100	138	179	222	254	281	312	378	418	455	498	551	591					
(Areas 2 and 3)	C	8	100	146	180	218	251	281	293	334	365	393	432	464	493	524	560	601	646	671
Arizona	S	3	100	140	195	238	279	313	335	357	383	405	430	459	492	510	525	552	582	603
	C	7	100	151	194	224	254	291	334	380	429	485	533	580	639	690	729	777	818	865
Central Flyway																				
Nebraska	S	3	100	158	209	248	274	291	306											
	C	7	100	159	203	246	288	336	372	404	433	461	488	514	540	570				
Kansas	S	5	100	163	211	245	271	292	305	316	324	335	341	351	356	362				
	C	5	100	163	204	242	274	307	327	353										
Oklahoma	S	4	100	164	224	283	330	369	394	448	506	530	548	568	592	618				
	C	6	100	156	234	303	349	380	415	443	464	486	511	532						
Mississippi Flyway																				
Iowa	S	2	100	126	152	168	178	188	196											
	C	8	100	143	177	201	221	237	254	267	283	300	312							
Indiana	S	8	100	139	171	200	221	248	264	287										
	C	2	100	141	164	191	210	231	251	266	282	293	302							
Ohio	S	6	100	140	174	196	215	235	257	271	289	304	337							
	C	4	100	134	159	183	207	222	236	255										
Atlantic Flyway																				
New York	S	5	100	131	151	165	180	190	201	212	223	244	254	267						
(Mainland)	C	5	100	133	154	170	185	195	204	215	224	235	241							
Pennsylvania	S	3	100	133	147	157	165	178	184	189	194	197								
	C	7	100	131	153	167	180	192	204	213	219	232	241	248						
New Jersey	S	6[a/]	100	157	197	226	250	271	289	310	340	371	400	420						
	C	3	100	147	181	221	252	275	298	331	357	386								
Delaware	S	5	100	140	169	187	214	236	256	274	289	307								
	C	5	100	146	190	229	261	285	311	339	366	393								
Maryland	S	2	100	152	220	270	310	371	446	511	570	624								
	C	8	100	154	207	247	277	311	352	386	427	473	503							
Florida	S	4	100	141	172	204	232	257	280	306										
	C	6	100	132	162	189	214	233	256	281	301	310	332							

a/ Excluding 1963 when fire closures markedly affected the distribution of the harvest.

Daily Shooting Hours

Daily shooting hours (Table 2) can be important in the regulation of waterfowl harvest. The shooting hours in effect during certain special and experimental seasons have been examined in detail. In 8 of 14 years, shooting hours during the special Columbia Basin season were extended to ½ hour after sunset (Table A-3) in an attempt to increase the harvest of mallards while leaving the kill of other ducks essentially unaffected. Duck Wing Survey data for 1967 (Table 25) indicate that hunting after sunset was not nearly as selective for mallards as many supporters of the regulation had anticipated. The incidence of mallards in the bag increased somewhat after sunset in Washington and Oregon, but a decrease was recorded in Idaho. Overall, mallards made up about 66% of the bag before sunset versus 71% during the ½ hour after sunset. The lengthening of shooting hours appears to have materially increased the bag of all species of ducks present, with increases of 7.5% for mallards and 5.9% for other ducks.

Shooting hours for the 1966 and 1967 San Luis Valley experimental October seasons were changed from the standard sunrise-to-sunset to the period from ½ hour before sunrise until noon (Table A-4). Daily hunting success for 1965-1970 was examined by period of the day to determine the effects of these changes (Table 26). Average sunrise times, which sometimes differed by several minutes from actual sunrise at some sites, were used. This had its greatest effect in 1965 and accounts for much of the apparently illegal kill before sunrise that season. Daily limits were the same in 1965 and 1966, and the 1966 change in shooting hours had no apparent effect on daily success (Table 26). Apparently the ½ hour period before sunrise and the period from noon to sunset contributed about equally to success, each furnishing about 25% of the daily bag. Likewise, the percentage of mallards in the harvest (Table 12) showed no change attributable to the change in shooting hours. In 1967, San Luis Valley regulations differed for drake mallards and for other ducks, one purpose being to encourage hunters to indentify ducks before shooting them. The presunrise proportion of the harvest decreased appreciably, clearly indicating that hunters refrained from shooting when light conditions made identification of flying birds difficult. Even after sunrise, the bag accumulated more slowly in 1967 than in 1966, additional evidence that hunters were being more selective. This slower accumulation of birds in the bag also indicates a lengthening of the average hunter's shooting day. Hunters afield in 1966 had bagged 61% of their birds by an hour after sunrise; in 1967 only 47% of the birds were taken in the same period of time, even though the commonest daily bag in 1967 was only two, compared with five each previous season. Although average daily success (ducks bagged per hunter-day) may also be affected by the number of weekend days in a particular season, hunters obviously spent more time afield per bird bagged in 1967. Since all available evidence indicates that the total number of ducks available to hunters was not important in limiting hunter success in any of the years during this period, we conclude that the average hunter's efforts to shoot selectively played a major role in lowering his success in 1967. These signs of selectivity continued during 1968-1970 under the point system, with sunrise to sunset shooting hours again in effect. Especially in 1969, more hunters extended their hunting into the afternoon, apparently because fewer limits were bagged in the morning. Thus it appears that the shooting hour alternatives tested in the San Luis Valley had little net effect on the harvest.

Unpublished Duck Wing Survey data from the Pacific Flyway have been tabulated by time of day for 1961, when shooting time began ½ hour before sunrise. About 10% (range: 5-12%) of the duck harvest occurred before sunrise, 65% (range: 50-69%) between sunrise and noon, and 25% (range: 18-40%) after noon. Allowing for differences in the regulations, the harvest appears to have been spread somewhat more evenly through the day here than in the San Luis Valley. Data tabulated by Geis and Carney (1961) for 1959 in the Mississippi Flyway indicate that, with a sunrise opening, about 73% (range: 57-93%) of the harvest occurred before noon, very similar to the 1965 pattern in the San Luis Valley. Their data also showed that more of the harvest occurred early in the day for diving ducks than for dabblers, and it is well known that wood ducks are more vulnerable to shooting around sunrise and sunset. Thus, even when a change in shooting hours can be expected to produce

Table 25. Species composition of the duck bag before and after sunset and increase in the size of the duck bag attributed to hunting after sunset in the Columbia Basin area during the 1967-68 hunting season, based on Duck Wing Survey data.

Species	Species composition (percent)								Calculation of increase due to hunting after sunset		
	Washington		Oregon		Idaho		Entire area		Kill index		Percent increase
	Before sunset	After sunset	Before sunset	After sunset	Before sunset	After sunset	Before sunset	After sunset	Before sunset	Entire day	
American Wigeon	8.6	3.1	8.2	15.4	10.3	10.5	9.2	8.7	49,025	52,236	6.5
Green-winged teal[a/]	8.3	3.1	8.7	7.7	7.1	0	7.9	3.0	42,215	43,337	2.7
Gadwall[b/]	4.4	0	1.6	0	2.0	5.3	3.3	1.9	17,669	18,386	4.1
Pintail	7.9	6.3	2.2	2.6	4.4	10.5	6.2	7.0	33,285	35,871	7.8
Others	8.6	9.4	9.8	0	5.9	13.2	7.7	8.6	41,077	44,269	7.8
Subtotal	37.8	21.9	30.5	25.7	29.7	39.5	34.3	29.2	183,271	194,099	5.9
Mallard	62.3	78.1	69.4	74.4	70.3	60.5	65.8	70.8	352,110	378,359	7.5
Total	100.1	100.0	99.9	100.1	100.0	100.0	100.1	100.0	535,381	572,458	6.9
Wings in sample	642	32	183	39	546	38	1371	109			

a/ *Anas crecca*
b/ *A. strepera*

Table 26. Average daily success and distribution of the duck bag by time of day during the experimental San Luis Valley season, 1965-1970, based on Duck Wing Survey data.

Interval (morning periods shown relative to sunrise)	Percent of total duck bag					
	1965	1966	1967	1968	1969	1970
Before sunrise	5.1	24.3	13.3	2.1	0.7	2.3
1st hour after	37.1	36.5	33.3	23.0	17.5	19.5
2nd hour after	16.0	16.5	25.5	21.8	20.9	22.2
3rd hour after	7.0	12.3	15.1	14.7	12.0	15.5
4th hour after	4.8	7.6	7.8	7.6	7.7	8.1
5th hour after	1.9	2.0	4.2	3.2	4.2	3.4
6th hour after until noon	1.6	0.6	0.7	3.1	2.3	1.7
After noon	26.4	0.4	0.1	24.5	34.7	27.5
Total	99.9	100.2	100.0	100.0	100.0	100.2
Ducks bagged per hunter-day	2.65	2.64	2.21	1.78	2.05	2.30
Number of weekend days in season	6	6	5	4	5	6

only minor changes in the mallard harvest, the possibility that other species may be more seriously affected must still be considered.

Green (1963), using bag check data from public hunting areas along the upper Mississippi River for 1954-1960, found that 8% of the harvest and 4% of all hunter-hours occurred during the presunrise ½ hour. Thus, the success rate during the ½ hour before sunrise was twice that for the entire day. Specific information for other periods (e.g., 1st hour after sunrise) is lacking for the plotting of a daily success curve, however. Other studies of the effects of shooting hour regulations have tended to emphasize their effects on waterfowl behavior, but effects on harvest are often noted as well. Jahn and Hunt (1964) indicated that when shooting hours were reduced by a 4:00 p.m. closure in Wisconsin, the duck harvest tended to be reduced as well. Pirnie (1935) commented that reduced shooting hours and rest days generally had no marked effect on waterfowl behavior or harvest in Michigan but that results were variable and dependent on local conditions. Apparently ducks and hunters usually accommodate themselves to particular shooting hours so that the overall effects tend to be relatively small, but local exceptions can be of major importance. For example, the effectiveness of restricting shooting hours and manipulating hunt days on a local area to increase harvests of Canada geese *(Branta canadensis)* has been well documented (Hunt et al. 1962; Hunt 1968).

Daily Bag Limit

Daily bag limits are modified almost every year in response to harvest management objectives, too often with little more than intuition as a guide in choosing among the many alternatives available. Data which can be used to improve this situation are now available from a number of sources.

Because hunters report dates of kill on their Duck Wing Survey envelopes, their daily success can be determined. It is then possible to calculate how much each bird in the bag limit contributed to their kill. Some results of such an examination are shown in Table 27 for the regular duck season in several important mallard harvest States. Of course, one-bird increases or decreases have much less effect on the total kill when the daily bag limit is high than when it is low. As the limit becomes larger, the last duck bagged makes up a smaller fraction of the total and, equally important, an ever-increasing fraction of the hunters fail to reach the limit. For example, in Idaho (Table 27) the third duck in the bag increased the kill by 28%, but the increase from five ducks to six increased the kill by only 4%. Changing the bag limit on a particular species effectively alters the total harvest only if that species normally makes up a substantial portion of the total. For example, in Arkansas, mallards averaged 85.7% of the harvest during years with no special mallard restriction, and the third bird in the bag increased the harvest of all ducks 27%. When the daily mallard limit was reduced to two (still in a total of four ducks), the third bird in the bag increased the harvest only 13% and the incidence of mallards dropped to 72.6%. In Minnesota, where mallards averaged only 28.9% of the harvest when there was no special restriction on them, reducing the daily mallard limit to two (in a total of four ducks) appears to have had no impact on either total harvest or the proportion that were mallards.

Questionnaire surveys in which respondents are asked to indicate the number of ducks taken by date during the season are an alternate source of information on daily hunting success. If party hunting is a significant factor, both questionnaire and wing survey results might be expected to overestimate the importance of additional birds in the bag limit. However, Scheftel (1958) used a questionnaire that allowed him to recognize party hunting in calculating the effect of increasing the daily bag limit from four to five in Minnesota in 1956. He found that the fifth duck in the bag increased total harvest by about 6.6%, somewhat more than might be expected from the wing survey figures in Table 27. Of equal interest, his data show that the importance of an additional duck in the bag limit tended to decrease as season length increased; i.e., that the effects of bag limit and season length were not independent. Grieb's (1960) questionnaire data for the Central Flyway indicate that changes in bag limit tend to produce smaller changes in total harvest than are indicated here by wing survey data. This may again reflect biases in the surveys, with wing survey estimates yielding an upper limit and questionnaire estimates a lower limit.

Some results of the special bag limit regulations tested during the last 4 years of the San Luis Valley season were examined based on questionnaire data

Table 27. Average increase in duck harvest attributable to each additional duck allowed in the daily bag, based on information supplied by Duck Wing Survey cooperators from selected States, 1961-1971.

State	Daily bag limit		Hunting seasons	Daily reports examined	Percent increase in daily harvest due to nth duck in bag where n is:						Cumulative percent increase in daily harvest from ducks 1 through n where n is:					
	Duck	Mallard			2	3	4	5	6	7	2	3	4	5	6	7
Arkansas	4	4	2	1,169	73	27	13	-	-	-	73	120	148	-	-	-
	4	2	5	3,147	70	13	5	-	-	-	70	92	101	-	-	-
Minnesota	4	4	2	1,975	64	23	9	-	-	-	64	101	119	-	-	-
	4	2	3	3,463	69	23	12	-	-	-	69	109	133	-	-	-
	4	1	2	1,834	48	16	6	-	-	-	48	71	82	-	-	-
Kansas	5	5	2	2,008	65	25	13	7	-	-	65	106	132	147	-	-
	4	4	5	3,351	69	21	10	-	-	-	69	105	125	-	-	-
Idaho	6	6	9	4,851	71	28	14	9	4	-	71	118	149	169	179	-
	6	3	2	703	71	27	11	4	2	-	71	117	140	151	156	-
California	7	7	3	6,802	77	33	19	12	8	5	77	135	178	212	237	252
	6	6	4	9,721	79	34	19	11	7	-	79	139	185	217	239	-
	6	3	1	2,252	77	33	18	11	6	-	77	136	179	210	230	-
	5	5	2	2,912	77	32	18	10	-	-	77	134	177	206	-	-
	5	3[a/]	1	1,804	76	32	15	8	-	-	76	131	166	188	-	-
Hypothetical maximum	7	7	-	-	100	50	33	25	20	17	100	200	300	400	500	600

a/ Also limited to 3 pintails.

(Table 28). During the first 4 years, with their nearly identical bag limit regulations, daily hunting success was generally high and fairly uniform, though perhaps increasing slightly in the later years. Success during this period appears similar to that shown for California through bag size five (Table 27). During the last 4 years, bag limits were potentially more liberal than during the first 4, and probably appeared more liberal to most hunters, wildlife officials, and the public. However, daily success was consistently lower than during the first 4 years, though it again shows a tendency to increase during successive point-limit years. The reduction in success indicates that the potential for a higher daily bag was more than offset by the various restrictions on the bag's composition.

Similarly, studies of the other point-limit system regulations that have been field tested thus far (e.g., Martz et al. 1972; Mikula et al. 1972; Bishop 1973; Geis and Crissey 1973) have consistently shown hunter activity and success levels of the same general magnitude as would be expected from fixed-limit regulations, and the more flexible control over harvest and hunter behavior has generally been judged to outweigh any adverse effects. Of course, marked differences among States and years can and do occur under the point system just as under other regulations.

The techniques used in this section are just examples of some of the avenues by which an investigation of the effects of various hunting regulations can be approached. In the next section certain aspects are examined in greater detail in an attempt to bring the overall picture into better focus and provide a management tool having broad application for the setting of waterfowl regulations.

Theoretical Effects of Various Regulations

Two types of questions repeatedly come up at meetings where the setting of waterfowl hunting regulations is discussed: (1) How many more ducks would be saved (or bagged) under this regulation than under that one? (2) What optional regulation can we offer that will result in the same total duck bag but will reduce the bag of a particular species we feel needs more protection this year? In the previous section we concentrated on describing the results of various specific hunting regulations in terms of their effects on harvest as observed under field conditions. In this section we will use these field observations of actual events as the basis for predicting expected harvest under specific alternative regulations.

Many variables affect harvest—variables which cannot be controlled under field conditions—so in making predictions, it is necessary to assume that all factors other than the specific regulation(s) being examined remain constant. Since this can happen only under carefully controlled (i.e., laboratory) conditions, predictions about what will happen under field conditions will, of course, be subject to error. Such errors will be of greatest concern when comparing predicted with actual events, and least important when comparing alternative predicted events. Hunter numbers, for example, may still change and affect results, but the duck population would be the same no matter which regulation was chosen.

In many situations, the observed effects of particular regulations are immediately applicable to making predictions, e.g., season length records showing the effects of various increases and decreases on seasonal harvest (Table 23). In others, further development of the theoretical base is desirable. This is done for bag limit regulations in this section, after which individual components of the regulations are brought together for a more comprehensive examination of their effects when used in combination.

Predicting the Results of Bag Limit Alternatives

Questions about the comparative effectiveness of various bag limit regulations for harvest management are prominent in most discussions of regulations, but reliable answers have been in short supply. The approach outlined in this section is being developed further by C. F. Kimball and R. E. Munro of the U.S. Fish and Wildlife Service, work which is expected to lead to a separate publication, so the background discussion presented here has been condensed.

Refinement of procedures.—Duck Wing and Hunter

Table 28. Average change in duck harvest attributable to each duck allowed in the daily bag during the experimental San Luis Valley season, 1963-1970, based on Hunter Questionnaire Survey data.

Hunting season	Daily bag limit	Cumulative percent increase in daily harvest from duck 1 through duck n where n is:									Cumulative percent decrease in daily harvest expected had bag limit been reduced from its actual level to:							
		2	3	4	5	6	7	8	9	10	9	8	7	6	5	4	3	2
1963-64	5 ducks	78	134	174	202	-	-	-	-	-	-	-	-	-	-	9	22	41
1964-65	5 ducks	78	133	177	208	-	-	-	-	-	-	-	-	-	-	10	24	42
1965-66	5 ducks	80	139	185	222	-	-	-	-	-	-	-	-	-	-	12	26	44
1966-67	5 ducks	83	145	193	229	-	-	-	-	-	-	-	-	-	-	11	25	45
1967-68	2 ducks + 4 male mallards	78	128	158	178	191	-	-	-	-	-	-	-	-	4	11	22	39
1968-69	Point system	74	118	141	154	162	166	-	-	-	-	-	-	1	4	9	18	34
1969-70	Point system	79	127	158	178	189	195	-	-	-	-	-	-	2	6	13	23	40
1970-71	Point system	80	132	167	189	196	201	203	204	204	tr.	tr.	1	3	5	12	24	41

Questionnaire Surveys that provide data on daily bag size indicate how successful hunters are in a particular situation, i.e., they provide a "success curve" for a specific area and set of hunting regulations. When no restrictions are in effect on type (species or sex) of duck, this success curve is also an "opportunity curve," or an indicator of how available ducks are to hunters at a particular time and place. These curves are estimated by the frequency of occurrence of each bag size up to the daily bag limit. The opportunity curve shows the average successful hunter's chances of reaching a specified bag size in the absence of regulations designed to encourage selective shooting. The Duck Wing Survey samples only hunters who have taken at least one duck (thus the probability of one duck = 1), so the probability of taking a second duck is calculated as the ratio of the number of second ducks to the number of first ducks. The method of calculating the probability for each successive duck in the bag is further illustrated in Part I of Table 29.

Under most bag limit regulations in effect in recent years, the impact of various restrictions becomes very noticeable after the second duck is taken. The likelihood of taking additional ducks is influenced by hunter selectivity and no longer depends simply on availability, which eliminates point system records as reliable data sources, even for first ducks. While it is sometimes possible to reconstruct the opportunity curve that would apply if there were no restrictions, it is usually necessary, or at least more convenient, to use an idealized curve based on the assumption that the probability of taking an additional duck is a constant. This assumption of constant probability is also useful for extending probability estimates beyond bag sizes represented in baseline data (Table 29, Part I, Section C). Thus, if the probability of taking one additional duck (the second duck) is 0.80, the probability of taking two additional ducks (a third duck) would be $0.80^2 = 0.64$; the probability of a successful hunter taking a total of four ducks would be $0.80^3 = 0.512$, etc. (The probability of taking the first duck may be written as $0.80^0 = 1.000$.) Where it has been possible to test this assumption under conditions of liberal bag limits with no species restrictions, it has usually appeared to somewhat overestimate the importance of the larger bag sizes. This indication could be false because of biases in the survey sample, but it is probably real, arising from a tendency for the probability of an additional bird to decrease somewhat as the day passes, something the procedure of using an average daily probability procedure fails to recognize. Such a bias would affect a comparison of the actual and theoretical results of a particular regulation but make relatively little difference in comparisons of the theoretical results of different regulations.

Like the distribution of daily bag sizes, the relative numbers of each type of duck in the seasonal bag provide a basis for estimating the availability of each to hunters. If bag limit restrictions by type have been in effect, it will again be necessary to restrict the examination to the first few (or first only, depending on the restriction) bag size classes under a fixed-limit system to get an availability estimate which is relatively unaffected by hunter selectivity and survey biases. The resulting probabilities provide a baseline for calculating the expected size and composition of the average daily bag (Table 29, Part II, Section C) under a variety of bag limit regulations, including the point system. The expected value is obtained by eliminating all components of the bag that are legally impossible under the new regulation and adding up the remaining, legal components.

Application of the technique.—The process just outlined for the calculation of the size and composition of the duck bag expected under particular bag limit regulations, hunter activity, and duck availability was used to compare the five sets of bag limit regulations (Table A-4) tested in the San Luis Valley between 1963 and 1970. The example (Table 29) for two regulation groups (M + D) was expanded to accommodate three in working with point system regulations. More groups can be handled, although for a point system with maximum reordering, the calculations become quite complex. Like the success figures in Table 12, the results of these comparisons (Table 30) indicate that the regulations tested the last 4 years, despite their higher potential bag limits (as high as 10 in 1970), were more restrictive than those the first 4 years. Furthermore, all three sets of point-system regulations were more restrictive than either of the fixed-limit systems. The calculations further indicate that if reordering had been legal and hunters had taken full advantage of it (i.e., assuming max-

Table 29. Outline of procedure for comparing theoretical hunting success under various bag limit regulations, based on data from the experimental San Luis Valley seasons.

I. Computation of probability of obtaining each successive duck in the bag after the first.

A. Detailed examination of 1963 Hunter Questionnaire Survey data:

Observed distribution of daily bags among successful hunters		Number of ducks bagged by order in bag and successful hunter's probability of taking the ith duck			
Bag size	Number of hunters	Order in bag (i)	Total ducks bagged	Observed probability	
1	278	1st	1,284	1.0000	
2	292	2nd	1,006	0.7835	(2nd ÷ 1st)
3	202	3rd	714	0.5561	(3rd ÷ 1st)
4	152	4th	512	0.3988	(4th ÷ 1st)
5	360	5th	360	0.2804	(5th ÷ 1st)
Total	1,284	Total	3,876	3.0188	

B. Results of examination of all data for the 1963-1966 period:

Order in bag (i)	Observed probability of taking the ith duck					Average probability of taking the next duck	
	1963	1964	1965	1966	Average (P_i)		
1st	1.0000	1.0000	1.0000	1.0000	1.0000	0.8072	(2nd ÷ 1st)
2nd	0.7835	0.7950	0.8252	0.8250	0.8072	0.7459	(3rd ÷ 2nd)
3rd	0.5561	0.5880	0.6364	0.6280	0.6021	0.7711	(4th ÷ 3rd)
4th	0.3988	0.4690	0.5125	0.4770	0.4643	0.7571	(5th ÷ 4th)
5th	0.2804	0.3370	0.4316	0.3570	0.3515	--	
Total	3.0188	3.1890	3.4057	3.2870	3.2251	--	

C. Estimated probability of taking a 6th duck (legal under 1967 regulations) = probability of taking 5th duck times probability of taking next duck (most current estimate) = (0.3515)(0.7571) = 0.2661.

II. Examination of species composition data by regulation group and as possible components of the bag under 1967 regulations.

A. Relative occurrence of mallard drakes and other ducks in the bag during the baseline period, 1963-1966:

Regulation group	1963	1964	1965	1966	Average
Mallard drakes	0.502	0.474	0.442	0.412	0.458 ($=M$)
Other ducks	0.498	0.526	0.558	0.588	0.542 ($=D$)
Total	1.000	1.000	1.000	1.000	1.000

B. Possible ways (combinations) in which mallard drakes (M) and other ducks (D) can be taken in bags of various sizes, together with the relative importance of each component (permutations):

Order in bag	Formula	Complete expression
1st	$(M+D)^1$	$M + D$
2nd	$(M+D)^2$	$M^2 + 2MD + D^2$
3rd	$(M+D)^3$	$M^3 + 3M^2D + 3MD^2 + D^3$
4th	$(M+D)^4$	$M^4 + 4M^3D + 6M^2D^2 + 4MD^3 + D^4$
5th	$(M+D)^5$	$M^5 + 5M^4D + 10M^3D^2 + 10M^2D^3 + 5MD^4 + D^5$
6th	$(M+D)^6$	$M^6 + 6M^5D + 15M^4D^2 + 20M^3D^3 + 15M^2D^4 + 6MD^5 + D^6$

C. Calculation of size and composition of average bag expected under 1967 bag limit regulations:

Order in bag (i)	Illegal bag components	Probability of taking illegal components		Probability of taking remaining legal components			Probability of taking ith duck (P_i)	Expected size and composition of average bag under 1967 regulations		
		Mallard drakes	Other ducks	Mallard drakes (A_i)	Other ducks (B_i)	Total		Mallard drakes (A_iP_i)	Other ducks (B_iP_i)	Total
1st	--	0	0	0.4580	0.5420	1.0000	1.0000	0.4580	0.5420	1.0000
2nd	--	0	0	0.4580	0.5420	1.0000	0.8072	0.3697	0.4375	0.8072
3rd	D^3	0	0.1592	0.4580	0.3828	0.8408	0.6021	0.2758	0.2305	0.5062
4th	$3MD^3 + D^4$	0	0.3051	0.4580	0.2369	0.6949	0.4643	0.2126	0.1100	0.3226
5th	$6M^2D^3 + 4MD^4 + D^5$	0	0.4053	0.4580	0.1367	0.5947	0.3515	0.1610	0.0481	0.2090
6th	$10M^3D^3 + 10M^2D^4 + 5MD^5 + D^6$	0	0.4664	0.4580	0.0756	0.5336	0.2661	0.1219	0.0201	0.1420
		Average bag (birds per successful hunter-day) =						1.5990	1.3881	2.9871

Table 30. Comparisons of observed and predicted changes in hunting success between the baseline period 1963-1966 and subsequent years resulting from changes in bag limit regulations (all other factors assumed constant) during the experimental San Luis Valley season, based on the method introduced in Table 29.

Hunting season	Basis of estimate	Bag per successful hunter-day				Incidence in the bag (percent)		
		Mallards		All ducks		Mallards		Other ducks
		Drakes	Hens	Total	Difference from baseline	Drakes	Hens	
1963-1966	Observed	1.4771	1.0417	3.2251	Baseline	45.8	32.3	21.9
1967	Expected	1.5990	0.8272	2.9871	- 7%	53.5	27.7	18.8
	Observed	1.3638	0.6896	2.8684	-11%	47.6	24.0	28.4
1968	Expected:							
	Legal order	1.1526	0.8128	2.5165	-22%	45.8	32.3	21.9
	Reordered	1.5371	0.8128	2.9336	- 9%	52.4	27.7	19.9
	Observed	1.4921	0.5231	2.6593	-18%	56.1	19.7	24.2
1969	Expected:							
	Legal order	1.0372	0.7315	2.2647	-30%	45.8	32.3	21.9
	Reordered	1.5484	0.7315	2.9569	- 8%	52.4	24.7	22.9
	Observed	1.5092	0.4843	2.9528	- 8%	51.1	16.4	32.5
1970	Expected:							
	Legal order	1.0565	0.7451	2.3068	-28%	45.8	32.3	21.9
	Reordered	1.5829	0.7451	3.1032	- 4%	51.0	24.0	25.0
	Observed	1.1352	0.5347	3.0410	- 6%	37.3	17.6	45.1

imum reordering), the 1970 regulation would have been more restrictive than the 1963-66 regulation but less restrictive than the 1967 regulation. The figures for average bag with reordering maximized are misleading, however, since they fail to recognize that substantially lower average success must result when hunters, exercising the high degree of selectivity needed for extensive reordering, must delay shooting long enough to identify each bird, thereby missing shots, and refrain from shooting at all when the identification cannot be made in time.

The most important assumptions involved here are that (1) hunting activity, hunter opportunity, and duck availability remain constant and (2) hunters become neither more nor less selective in their shooting than during the baseline period. As indicated already, varying degrees of selectivity can be readily induced through the use of hunting regulations. Thus, if the first assumption is valid, comparing the theoretical and actual results of bag limit regulations can provide a crude but useful measure of changes in hunter selectivity. Such a comparison for the San Luis Valley regulations (Table 30) shows that the incidence of ducks other than mallards in the bag was invariably higher than predicted, i.e., than it would have been had hunters been shooting as unselectively as during the baseline years. The incidence of mallard hens was invariably lower than predicted while that of mallard drakes was usually, but not always, higher. When there were restrictions on mallard hens, the bag of mallard drakes generally increased less than the bag of other ducks, even though the bag limit on drakes was often the least restrictive.

Apparently the selectivity against mallard hens tended to carry over to drakes because of their similar appearance, whereas most other ducks were taken without the extra moment of hesitation required to distinguish both species and sex. Perhaps more important in some years, substantial numbers of mallard drakes could still be in eclipse plumage in early October; these may have been misidentified in flight as hens and not shot. The marked reduction in the incidence of mallard drakes in 1970 may be evidence of how the psychological effect of switching a bird of relatively high availability from the lowest point category, with a potential limit of 10 per day, to a category with a potential limit of only 5 per day, can affect hunter selectivity. The effect predicted on theoretical grounds was essentially no change (Table 30). Although changes in duck availability could have marked effects on the duck bag, large differences between the actual and predicted size or composition of the bag will usually indicate that selectivity is at work. In fact, indications of the direction and degree of selectivity induced by a particular regulation may be the most important feature of such comparisons, since selectivity is a vital aspect of the regulation of hunting pressure through species management and a very difficult one to measure.

The results of the approach outlined in Table 29 can be summarized in tabular form, greatly simplifying comparisons of fixed-limit regulations. Table A-17 shows the predicted size and composition of the duck bag under a wide range of fixed-limit regulations at several levels of mallard availability. It is based on the opportunity curve for the San Luis Valley and thus applies to States where the opportunity to shoot a duck is relatively high. Table A-18 contains similar estimates based on the opportunity curve for the Columbia Basin area, where the probability of a hunter-duck encounter averages about 0.64, a level more representative of the average situation in the United States. Since lower opportunity curves result in lower success levels and smaller differences between regulations, these predictions will tend to overestimate success when the opportunity curve is lower than that in the table and underestimate it when the curve is higher. Used properly, however, such figures should be useful for estimating what will happen when a bag limit is changed.

Returning to the problems of setting bag limits which are more restrictive, more liberal, or equivalent, these tables make it clear that the answer may differ under different levels of availability for species of special interest. For example, where only 10% of the ducks available to hunters were mallards, there would be almost no difference in either the total bag or its composition whether the bag limit was five ducks including no more than two mallards, or five ducks that could all be mallards (the examples given here are derived from Table A-17). In contrast, where 75% of the ducks available were mallards, changing from a five-duck, five-mallard limit to a five-duck, two-mallard limit could be expected to reduce the duck bag by about 25% and the mallard bag by 33%. In looking for equivalent regulations, a four-duck,

two-mallard limit is approximately equivalent to a five-duck, one-mallard limit where about one-third of the ducks available are mallards, but in an area with 75% mallards a six-duck, one-mallard, or even a ten-duck, one-mallard limit (not shown in the table), would be more restrictive than a four-duck, two-mallard limit. The six-duck, one-mallard limit would produce about the same total harvest as a two-duck, two-mallard limit but would reduce the harvest of mallards substantially more.

The figures in Tables A-17 and A-18 are also useful for predicting the results of regulations involving three or more regulation groups and ducks of any species. For example, suppose the limit on canvasbacks (5% of the birds available) is one, the limit on mallards (40%) is two, and the limit on other ducks (55%) is four. At the 5% availability level in Table A-17, the expected bag of canvasbacks with a four-duck, one-canvasback limit is 0.135; at the 40% level the bag of mallards with a four-duck, two-mallard limit is 1.046; and at the 55% level the bag of other ducks with a limit of four is 1.580. Thus the total bag per successful hunter-day will be 2.761 ducks. What happens if scaup make up 25% of the available ducks and a bonus of two scaup is permitted? With a limit of four, 0.718 scaup was being taken per successful hunter-day. Increasing the limit to six raises the bag of scaup to 0.873, of canvasbacks to 0.160, of mallards to 1.148, and of other ducks to 1.044, for a total of 3.225 ducks. Thus a bonus in this situation increases the bag of scaup by about 22% during the time it is in effect but also increases the bag of other ducks by about 15%.

It is apparent from this example that the effect of a so-called bonus on commonly bagged species is similar to that of a bonus time period (Table 25), with both tending to increase the kill of all ducks, not just the designated species. It is equally apparent that, as implemented thus far, neither technique has lived up to expectations as a tool for selective species management.

Predicting the Results of Other Regulation Changes

The special Columbia Basin seasons have involved a variety of bonuses, but the dearth of specific information on the results of these seasons has largely frustrated attempts at evaluation. Another step in this direction can now be taken by using Table A-18 to compare the predicted bag under the Columbia Basin regulations and those in effect elsewhere in the same States. The predictions (Table 31) of course reflect only the changes in bag limit, since the figures in Table A-18 are based on the assumption that all other factors, such as possession limit, season length, and shooting hours remain constant. However, by using information presented earlier it is now possible to incorporate the expected effects of some of these other factors and arrive at a more comprehensive evaluation.

The Washington figures for 1965 will serve as an example. That year, shooting hours in the Columbia Basin extended to ½ hour after sunset; as estimated in Table 25, this increased harvests by averages of 7.5% for mallards and 5.9% for other ducks. Second, the Columbia Basin season was 100 days long versus a regular season of 86 days. By extrapolation of figures in Table 23, it is estimated that the longer season would result in bag increases of 6.0% ([194% ÷ 183%] - 100% = 6.0%) for mallards and 6.5% ([181% ÷ 170%] - 100% = 6.5%) for all ducks. These changes can now be applied to the original Columbia Basin predictions in Table 31 to produce estimates of the combined effects of bag limit, shooting hours, and season length (making the assumption that these effects are independent with no interactions). This combination of regulations would be expected to result in an average harvest of about 1.975 mallards (1.733 x 107.5% x 106.0% = 1.975) and 2.944 total ducks ([[[2.584 - 1.733] x 105.9%] + [1.733 x 107.5%]] x 106.5% = 2.944), 27% and 23% greater, respectively, than the averages predicted under regular season regulations. The relative importance of individual elements of hunting season regulations and their combined impact become much clearer when this type of evaluation is used. However, the assumption of independence is highly suspect, as the previously cited example (Scheftel 1958) indicated, for bag limit and season length. (The calculation of separate opportunity curves for each month, or other period, might be appropriate when season length or opening date changes are involved.) Therefore, such chain calculations should be used very cautiously.

As before, it is advisable to compare predicted results with actual results whenever possible so that

Table 31. Theoretical increase in daily hunter success in the Columbia Basin attributable to "bonus" ducks in the daily bag limit. (Estimates based on the probability calculations summarized in Table A-18, which assume all factors except bag limit remain constant; M = mallards, O = other ducks, T = total ducks.)

Seasons Areas	Washington (M availability = 67%)			Oregon (M availability = 75%)			Idaho (M availability = 80%)		
	Limits	Expected values		Limits	Expected values		Limits	Expected values	
	(M-O-T)	$\bar{x}$ M	$\bar{x}$ T	(M-O-T)	$\bar{x}$ M	$\bar{x}$ T	(M-O-T)	$\bar{x}$ M	$\bar{x}$ T
1961-1963									
State	4-4-4	1.560	2.340	4-4-4	1.755	2.340	5-5-5	2.008	2.510
Basin	6-4-6	1.733	2.598	6-4-6	1.950	2.599	7-5-7	2.120	2.650
Increase		11.1%	11.0%		11.1%	11.1%		5.6%	5.6%
1964									
State	4-4-4	1.560	2.340	4-4-4	1.755	2.340	5-5-5	2.008	2.510
Basin	8-4-8	1.787	2.675	8-4-8	2.010	2.678	8-4-8	2.144	2.680
Increase		14.6%	14.3%		14.5%	14.4%		6.8%	6.8%
1965									
State	3-5-5	1.553	2.390	3-4-4	1.670	2.255	3-5-5	1.786	2.288
Basin	6-3-6	1.733	2.584	6-3-6	1.950	2.594	6-3-6	2.080	2.598
Increase		11.6%	8.1%		16.8%	15.0%		16.5%	13.5%
1966									
State	5-5-5	1.673	2.510	5-5-5	1.883	2.510	5-5-5	2.008	2.510
Basin	6-6-6	1.733	2.600	6-6-6	1.950	2.600	6-6-6	2.080	2.600
Increase		3.6%	3.6%		3.6%	3.6%		3.6%	3.6%
1967,1969									
State	5-5-5	1.673	2.510	5-5-5	1.883	2.510	6-6-6	2.080	2.600
Basin	6-6-6	1.733	2.600	6-6-6	1.950	2.600	6-6-6	2.080	2.600
Increase		3.6%	3.6%		3.6%	3.6%		0	0
1968									
State	3-5-5	1.553	2.390	3-5-5	1.703	2.331	3-6-6	1.790	2.310
Basin	4-6-6	1.683	2.550	4-6-6	1.867	2.517	4-6-6	1.971	2.491
Increase		8.4%	6.7%		9.6%	8.0%		10.1%	7.8%
1970,1971									
State	6-6-6	1.733	2.600	6-6-6	1.950	2.600	7-7-7	2.120	2.650
Basin	7-7-7	1.767	2.650	7-7-7	1.988	2.650	7-7-7	2.120	2.650
Increase		1.9%	1.9%		1.9%	1.9%		0	0

the importance of hunter selectivity can be evaluated. Hunters shooting selectively will always attain a lower average bag than nonselective hunters under the same conditions. Thus, selectivity can cause the actual value to fall below the predicted value, but if the actual value exceeds the predicted value, factors other than selectivity must be responsible. Selectivity will also alter the composition of the bag, and it may affect the distribution of ducks bagged among hunters. With careful interpretation, theoretical predictions can play a very useful part in the evaluation of hunting regulations that promote changes in selectivity.

General Statistical Analysis of Regulations-Harvest Relationships

With the technical assistance of K. P. Burnham of the U.S. Fish and Wildlife Service, we used multiple correlation techniques to examine the effects of various hunting regulations on harvest. The more important mallard harvest areas were grouped into 40 "regulation" areas, usually following State boundaries. A number of variables representing harvests and regulations were tabulated for these areas by year for 1961-1971: total duck and mallard harvests, duck stamp sales, daily duck and mallard bag limits, limit type (point or fixed), opening date and day of the week (weekday or weekend), shooting hours, a split season code (yes or no), and an area type code (breeding, migration, or wintering). These variables were then examined in various combinations and the results tested statistically in an attempt to identify the more important relationships.

The results obtained were largely inconclusive and of limited usefulness, although the already obvious relationships were generally substantiated. However, much of the data base was concentrated into a rather narrow range of experience, and the complexity of the analysis reduced its effective size still further. Intercorrelations among the regulation variables presented serious problems in the analysis, and a more suitable covariant for converting total harvest into harvest rate is needed. Judging from their results, Krause et al. [1973] encountered similar problems in their statistical evaluation of the effects of hunting regulations on duck harvest.

In fact, regulations will have the same effects and the same interrelationships with the harvest throughout a population; e.g., if a new regulation results in a 10% increase in duck harvest in Area A, it will have the same effect in all areas, other conditions being equal. In practice, other conditions are almost never equal. Data examined earlier in this report repeatedly demonstrate that, while the effects of regulations often appear to differ from area to area, sometimes quite markedly, close scrutiny usually reveals additional variables to which such differences may be attributed. For example, a mallard bag limit restriction can have a marked effect on harvest in one area and a negligible effect in another area because of another variable—the species composition of the ducks available to hunters in each area. Apparently the present inability to consider a wider range of such variables in the multiple correlation analysis is responsible for the disappointing results. It is difficult to recognize which variables should be included and, because many variables are represented by only a few observations, sample size is also a limiting factor. Thus, the key to success in this type of analysis appears to be the identification of variables with significant effects and the ability to measure them in a manner suitable for inclusion. When this is possible, multiple correlation analyses of regulation-harvest relationships will undoubtedly give much more meaningful results. Meanwhile, although additional analyses of certain aspects are highly desirable, the general principles, specific results, and insights into many of these relationships detailed in earlier sections of this report would appear to be complete and reliable enough for incorporation into waterfowl harvest management work as guidelines, at least on a trial basis.

SUMMARY

Detailed information is presented on season dates, season length, bag and possession limits, shooting hours, bonuses, restrictions, and special seasons affecting the mallard in the United States from 1948 through 1974. During this period, duck stamp sales fluctuated between 1,147,212 (1962-63 season) and 2,446,496 (1971-72). A Hunter Questionnaire Survey conducted annually since 1952 indicates that the number of active adult waterfowl hunters has varied between about 880,000 (1962-63) and 2,030,000 (1957-58), and that waterfowl hunting has provided an average of about 12,260,000 hunter-days of recreation (range: 6,110,000 to 17,065,000) annually during this 23-year period. Of the figures examined, total hunter-days is the most sensitive and useful indicator of the level of waterfowl hunting pressure and changes therein.

The total duck harvest in the United States has fluctuated between about 4,250,000 (1962-63) and 15,830,000 (1970-71). Beginning with the 1961-62 season, mallard harvest data are presented for each of 100 Mallard Harvest Areas into which the United States has been divided for this study. Data for earlier years are summarized by State. Duck Wing Survey estimates indicate that about one-third of the ducks harvested since 1960 have been mallards (average: 3,570,000 mallards per year). Before 1960, when the survey depended on the hunter for species identification and mallard regulations were less restrictive, about 43% of the ducks taken were reported to be mallards (average: 5,440,000 mallards annually). During 1961-1970, the composition of the mallard harvest averaged about 1.3 immature birds per adult, 1.3 immature males per immature female, and 2.0 adult males per adult female. Generally, mallard age ratios tend to follow a 2-year cycle with alternate increases and decreases in consecutive years. In contrast, average sex ratios in the harvest vary essentially at random from year to year except that (1) the sex ratios of adult and immature birds are significantly correlated and (2) sex ratios in the harvest are sensitive to certain hunting regulations.

Total harvest typically accumulates rapidly during the first week or so of the season (opening day effect) after which the rate of increase stabilizes at a relatively low level, but there are enough variations in and exceptions to this pattern that no general rule is applicable to all areas. Changes during the hunting season in the relative size of the mallard component of the harvest also varied considerably among States, apparently reflecting variability in local migration patterns and interaction between migration and hunting regulations. In both situations, however, consistency from year to year is evident within States. Since it appears that a knowledge of these patterns in the harvest could be useful in tailoring future management practices to meet specific area requirements, these data are summarized for each of the more important mallard harvest States.

Further examination of the chronological distribution of the mallard harvest shows that immature birds tend to make up a steadily decreasing proportion of the harvest as the season advances. Males average about 56% of the harvest (vs. 50% of the population) of immature mallards. The relative stability of this figure in the absence of special regulations suggests that the difference in sex composition of immatures between the harvest and the population is due mainly to hunter selectivity. Thus, drakes are about 27% more likely to be shot than hens when regulations do not differ by sex. In addition, the sex composition of the adult mallard harvest changes through the season, suggesting a differential migration among adults.

Respondents in the Hunter Questionnaire Survey indicated that about 15% of the ducks shot were not retrieved. Adjustment of the retrieved kill for response bias raises this figure to 19%, but Hunter Performance Survey observations tend to support the lower figure, raising questions about both the bias adjustment procedure and general beliefs about the magnitude of the unretrieved kill of waterfowl.

Summaries of duck bag limits, Federal hunting permit sales, and selected results of Federal and Provincial waterfowl harvest surveys are included for Canada to complete the picture. Of the mallards harvested during the 8-year period for which survey figures are available from both nations (1967-1974), an average of 27% were taken in Canada. In general, Canadian harvests have shown higher immature to adult ratios while U.S. harvests have shown higher sex ratios, particularly among adults.

The effects of various hunting regulations on both hunter behavior and waterfowl harvest are examined in detail. Hunter compliance with bag limits was poor when fewer than two mallards were permitted in bags of from three to eight other ducks but improved rapidly when two or more mallards were permitted (under the fixed limit system). Also as a result of hunter behavior characteristics, differential hunting regulations, whether fixed-limit or point-limit, can be expected to increase the unretrieved kill rates on those species and sexes of birds with the lowest bag limits, at least if they are encountered frequently by hunters. Finally, Hunter Performance Survey data indicate that the average hunter's natural tendency is to be relatively unselective in shooting at mallard drakes and hens, but that varying degrees of selectivity can be readily induced with hunting regulations that encourage it.

More data are available on the effects of various hunting regulations on duck harvest. Since hunting pressure and success are almost always highest on opening day, the opening-day harvest is an important component of seasonal harvest, and hunting regulations which reduce opening day activity will tend to reduce seasonal harvest. Thus, while the starting time and day of the week for opening day may have little effect on average success on opening day or on day-to-day changes in success, late starting times (noon) and weekday openings can be expected, under most conditions, to reduce total seasonal success by reducing hunter participation and shifting it to less productive days.

Manipulation of the date of opening day is a more promising tool for regulating harvest because the characteristics of both the hunters and the duck population can be used to advantage. Since long-term data show that the incidence of various species and their age and sex compositions in the harvest change predictably through the hunting season in most areas, certain generalizations seem warranted. For example, earlier opening and closing dates should decrease mallard harvests in areas where they are late migrants but increase them where mallards are early migrants. Season dates can affect total harvest in a similar manner. A specified change can have markedly different effects in different areas, however.

Season length is often manipulated to regulate harvest, with variable results. Within States, the harvest tends to show the same chronology year after year, however, so it appears that changes in the harvests of ducks and mallards that would result from various changes in season length (within the range of past experience) could be predicted with acceptable reliability from the sets of average figures now available for individual States. The results of selecting a split season instead of a continuous one are too variable to generalize; some States seem able to gain an advantage from split seasons while others do not.

The effects of daily shooting hours on harvest are often reflected in the hourly distribution of that harvest. Included are several situations in which special modifications in daily shooting hours were being tested. For example, an attempt to use late shooting hours to promote the differential harvest of mallards in the Columbia Basin met with little success. More generally, the harvest appears to have been more evenly spread through the day in the Pacific Flyway and more concentrated in the morning hours elsewhere, but marked differences occur among States, so the effects of specific shooting hour changes will also vary. Some caution is necessary in using the hourly distribution of the harvest to evaluate shooting hour changes, however, since bag limit regulations designed to promote selective shooting can also affect hourly distribution. In such instances, knowledge of hourly distribution could be a rich source of information about the effectiveness of the bag limit regulation change.

Daily bag limits are routinely manipulated to regulate harvests, and reliable information, particularly predictions, about the effectiveness of such manipulations has long been needed by waterfowl managers. By tabulating the daily hunting success of individual hunters, the importance of various daily bag sizes can be established. Then alternative daily bag limits can be superimposed on these data and their effects evaluated. This basic approach has been taken a step further in this study by converting the various levels of hunter success to probabilities and an "opportunity curve" indicating how available ducks were at the particular time and place the data were collected. Duck Wing Survey data provide information on the availability of each type of duck to hunters. Opportunity figures are relatively

consistent from year to year within States. (Seasons having bag limit restrictions by type in effect are avoided for these calculations.)

Now it is possible to calculate the expected size and composition of the harvest under any bag limit, including the various bonuses and restrictions under fixed-limit regulations and reordering under the point system. For example, this approach clearly shows that a bonus on a species common in the bag, like a bonus time period, will increase the kill of all ducks, not just the bonus species, and is thus relatively unselective and not well suited to the needs of species management. It also confirms that the point-limit regulations tested in the San Luis Valley were more restrictive than the fixed-limit regulations they replaced, contrary to many expectations. A number of other examples of uses of this technique for comparing bag limits are presented, some potential problems are noted, and finally, the effects of several other regulation changes are tentively brought into the equation. It was found that this technique also detects and seems to provide some measure of the hunter selectivity induced by various regulations, an important feature as regulations aimed at promoting selectivity continue to see wide use.

One feature of regulations appeared again and again in this study: the effects of a given regulation often differ, sometimes dramatically, from area to area. Therefore, to make a realistic evaluation, each regulation proposed should be considered on a State-by-State basis.

The general approach used here for evaluating regulations assumes that (1) all factors other than those being examined are constants and (2) the factors being examined are independent. These are often rather weak assumptions and must therefore be considered in every analysis. Nevertheless, this approach and the generalizations drawn from it should be very useful to those seeking better waterfowl management through regulations that provide more sensitive control of hunting pressure.

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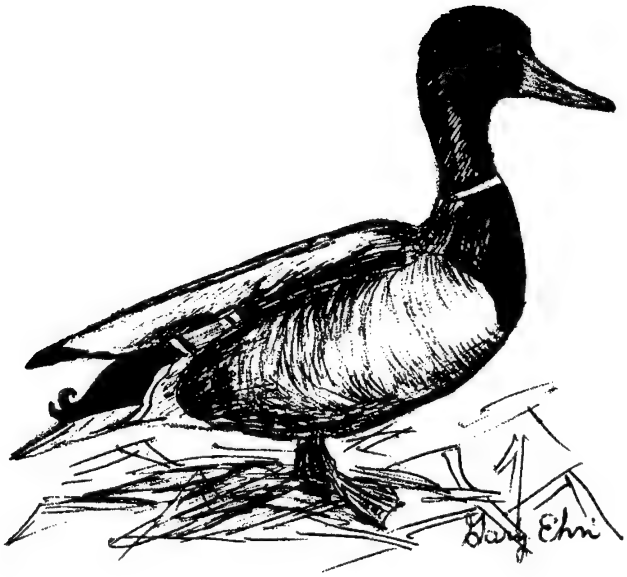

APPENDIX

Table A-1. Summary, by flyway, of basic duck limits (D) and exceptions to these limits (B = bonus; R = restriction; S = separate limit) in effect on the various species of ducks, sea ducks, and mergansers in the United States during the regular duck and sea duck seasons (exclusive of experimental and special seasons and some local exceptions), 1948-1974.

Hunting season	Alaska	Pacific Flyway	Central Flyway	Mississippi Flyway	Atlantic Flyway	Merganser limits and general information (except Alaska)
1948-49	D = 5:10. R = 1:1 wood duck. S = 25:none American (*Mergus merganser*)/red-breasted mergansers (*M. serrator*).	D = 5:10. R = 1:1 wood duck except closed in Arizona, Nevada, and Utah.	D = 5:10. R = 1:1 wood duck in Mont., N.M., Okla., and Texas; closed elsewhere.	D = 4:8. R = 1:1 wood duck.	D = 4:8. R = 1:1 wood duck except closed in Mass., N.J., and W. Va. S = 7:14 sea ducks (scoters and eiders) for designated areas and periods in Conn., Maine, Mass., N.H., N.Y., and R.I.	S = 25:none American/red-breasted mergansers. Hooded merganser included in basic duck limits.
1949-50	Same as 1948.	Same as 1948.	Same as 1948 except D = 4:8.	Same as 1948.	Same as 1948 except New Jersey added to States with R = 1:1 wood duck.	Same as 1948.
1950-51	Same as 1948 except D = 6:6 and S = 10:20 sea ducks (scoters and eiders) during extended season in designated areas.	Same as 1949 except D = 6:6.	Same as 1948 except D = 5:10 and Texas closed on black-bellied tree duck (*Dendrocygna autumnalis*).	Same as 1948.	Same as 1949 except old squaw (*Clangula hyemalis*) included in sea ducks.	Same as 1948.
1951-52	D = 5:10. Same as 1950 on sea ducks and mergansers except sea duck season dates and areas also apply to mergansers.	Same as 1950.	Same as 1950 except Nebraska added to States with R = 1:1 wood duck.	Same as 1948.	Same as 1950 except Massachusetts added to States with R = 1:1 wood duck.	Same as 1948.
1952-53	Same as 1951.	Same as 1950 except B = 2:2 wigeon/pintail.	Same as 1951.	Same as 1948.	Same as 1951.	Same as 1948.
1953-54	Same as 1951 except D = 7:14.	D = 7:7. Same restrictions as 1948. B = 4:4 wigeon/pintail.	Same as 1951.	Same as 1948.	Same as 1951.	S = 25:25 American/red-breasted mergansers plus 1:1 hooded merganser.
1954-55	Same as 1953 except old squaw and harlequin (*Histrionicus histrionicus*) included in sea ducks.	D = 6:12 or 7:7. Same restrictions as 1948. B = 3:3 wigeon/pintail.	Same as 1951.	D = 4:8. Closed on wood duck.	D = 4:8. Same as 1950 on sea ducks. Wood duck remains closed in West Virginia and R = 1:1 in New Hampshire; R = 1:2 elsewhere.	Mergansers included in basic duck limits with R = 1:1 hooded merganser.
1955-56	Same as 1954.	Same as 1954 except R = 1:1 wood duck.	Same as 1951 except R=1:1 wood duck in all States.	D = 4:8. R = 1:1 wood duck.	Same as 1954 except R = 1:2 wood duck in all States.	Same as 1954.
1956-57	Same as 1954.	Same as 1955.	Same as 1955.	D = 4:8 or 5:10. Closed on wood duck.	Same as 1955 except S = 7:14 sea ducks in all States.	Same as 1954.
1957-58	Same as 1954 except S = 10:20 sea ducks/mergansers or 5:10 mergansers (except hooded) depending on zone.	D = 5:10 or 6:6. R = 1:1 wood duck. B = 3:3 wigeon/pintail.	Same as 1955.	D = 4:8. R = 1:1 wood duck in Ala., Ark., La., Miss., Ohio, and Tenn.; closed elsewhere.	Same as 1956.	S = 5:10 American/red-breasted mergansers. R = 1:1 hooded merganser in basic duck limits.
1958-59	Same as 1957 except regular season dates apply to sea ducks and mergansers.	Same as 1957 except B = 4:4 wigeon/pintail.	Same as 1955 except D = 4:8 or 5:10. R = 2:4 redhead/canvasback. New Mexico closed on wood duck.	Same as 1957 except Arkansas closed on wood duck and R = 2:4 redhead/canvasback.	Same as 1956 except R = 2:4 redhead/canvasback.	Same as 1957.
1959-60	Same as 1958.	D = 5:10. R = 1:1 wood duck and 2:2 redhead/canvasback/ruddy.	Same as 1958 except D = 3:6 or 4:8 with R = 1:1 redhead/canvasback/ruddy.	D = 3:6 or 4:8. R = 1:1 redhead/canvasback/ruddy and 1:1 wood duck except 1:1 for all four species combined in Minnesota.	D = 3:6 or 4:8. R = 1:1 redhead/canvasback/ruddy. On wood duck, R = 1:1 in Pennsylvania, 1:2 in Massachusetts, and 2:2 elsewhere. Same as 1956 on sea ducks.	Same as 1957.
1960-61	D = 5:10. S = 10:20 sea ducks/mergansers (except hooded).	D = 4:8 or 5:5 or 6:6. R = 1:1 wood duck. Closed on redhead and canvasback.	Same as 1958 except D = 3:6 or 4:8; closed on redhead and canvasback.	Same as Central Flyway.	Same as 1959 except closed on redhead and canvasback; no restriction on ruddy duck.	Same as 1957 on mergansers. Closed on redhead and canvasback in all flyways.
1961-62	D = 5:10. S = 15:30 sea ducks/mergansers (except hooded). Closed on redhead and canvasback.	D = 4:8 or 5:5 or 5:10. R = 1:1 wood duck. Closed on redhead and canvasback.	Same as 1960 except D = 2:4 or 3:6 and R = 1:1 wood duck in all States.	Same as Central Flyway.	Same as 1960 except D = 2:4 or 3:6 with R = 2:4 black duck.	Same as 1960.
1962-63	Same as 1961.	D = 4:8 or 5:5. R = 2:2 wood duck. Closed on redhead and canvasback.	D = 2:4. R = 2:2 wood duck and 1:2 mallard. B = 2:4 scaup. Closed on redhead and canvasback.	Same as Central Flyway except black duck included with mallard in R = 1:2.	D = 2:4 or 3:6. Same as 1956 on sea ducks. R = 2:2 wood duck and 2:4 mallard/black duck. B = 2:4 scaup. Closed on redhead and canvasback.	Same as 1960 plus R = 2:2 wood duck in all flyways.

Table A-1.--continued. Summary, by flyway, of basic duck limits (D) and exceptions to these limits (B = bonus; R = restriction; S = separate limit) in effect on the various species of ducks, sea ducks, and mergansers in the United States during the regular duck and sea duck seasons (exclusive of experimental and special seasons and some local exceptions), 1948-1974.

Hunting season	Alaska	Pacific Flyway	Central Flyway	Mississippi Flyway	Atlantic Flyway	Merganser limits and general information (except Alaska)
1963-64	Same as 1961.	Same as 1962 except D = 4:8 or 5:10 or 5:5 or 6:6.	D = 4:8. R = 2:2 wood duck and 2:4 mallard. Closed on redhead and canvasback.	Same as Central Flyway except black duck included with mallard in R = 2:4 and B = 2:4 scaup in part of La.	Same as 1962 except D = 3:6 or 4:8.	Same as 1962 except R = 1:2 hooded merganser in basic duck limits.
1964-65	Same as 1961.	Same as 1963 except R = 2:2 redhead/canvasback.	Same as 1963 except R = 2:2 redhead/canvasback.	Same as Central Flyway except B = 2:4 scaup in part of Louisiana.	D = 3:6 or 4:8. Same as 1956 on sea ducks. R = 2:2 wood duck, 2:4 mallard, and 2:2 redhead/canvasback.	S = 5:10 mergansers including R = 1:2 hooded merganser. R = 2:2 redhead/canvasback and 2:2 wood duck in all flyways.
1965-66	Same as 1961 except R = 2:2 redhead/canvasback and B = 2:4 scaup.	D = 4:8 or 5:5 or 5:10. R = 2:2 wood duck, 2:2 canvasback, and 3:6 mallard/pintail.	D = 4:8. R = 2:2 wood duck, 2:2 canvasback, 1:2 mallard, and 1:2 pintail.	Same as Central Flyway except B = 2:4 scaup for designated areas and periods.	Same as 1964 except restriction on redhead removed and B = 2:4 scaup for designated areas and periods.	Same as 1964 except no restriction on redhead.
1966-67	Same as 1965 except no restriction on redhead or canvasback.	D = 5:10 or 6:12 or 6:6 or 7:7. R = 2:4 wood duck.	D = 3:6 or 4:8. R = 2:4 wood duck, 2:4 mallard, and 2:4 canvasback.	Same as Central Flyway except D = 4:8 and B = 2:4 scaup/ringneck for designated areas and periods.	D = 3:6 or 4:8. R = 2:4 wood duck and 2:4 canvasback. B = 2:4 scaup/ringneck for designated areas and periods (special seasons in some areas). Same as 1956 on sea ducks except extended season expanded to include parts of Md., N.J., and N.C.	Same as 1964 on mergansers. R = 2:4 wood duck in all flyways.
1967-68	D = 6:12. S = 15:30 sea ducks/mergansers (except hooded).	D = 5:10 or 6:12 or 6:6. R = 2:2 canvasback.	D = 3:6 or 4:8. R = 1:2 wood duck, 2:4 mallard, and 1:1 canvasback.	D = 4:8. R = 1:2 or 2:4 wood duck, 2:4 mallard, and 1:1 canvasback. B = 2:4 scaup for designated areas and periods.	Same as 1966 except R = 1:1 canvasback and 2:4 black duck. Ringneck removed from bonus and special limits.	S = 5:10 mergansers including R = 1:2 hooded merganser.
1968-69	Same as 1967.	D = 5:10 or 6:6. R = 3:6 or 3:3 mallard and 2:2 canvasback.	D = 3:6 or 4:8. R = 2:4 wood duck, 2:4 mallard, and 1:1 redhead/canvasback.	D = 3:6. R = 2:4 wood duck, 2:4 black duck, 1:1 redhead/canvasback, and 1:2 mallard except 2:4 mallard in Arkansas.	D = 3:6 or 4:8. R = 2:4 wood duck, 2:4 mallard, 2:4 black duck, and 1:1 redhead/canvasback. Same as 1966 on sea ducks except extended season expanded to parts of Virginia, South Carolina, and Georgia.	Same as 1967.
1969-70	Same as 1968 except D = 6:18.	D = 5:10 or 6:6. R = 2:2 canvasback.	D = 4:8. R = 1:1 redhead/canvasback, 2:4 wood duck, and 1:2 or 2:4 mallard. B = 2:4 scaup and/or 2:4 blue-winged teal for designated areas and periods.	Same as Central Flyway.	D = 3:6 or 4:8. R = 1:1 redhead/canvasback, 2:2 or 2:4 wood duck, and 1:2 or 2:4 black duck. Same as 1968 on sea ducks. B = 2:4 scaup for designated areas and periods.	Same as 1967.
1970-71	Same as 1969.	D = 6:12 or 7:7.	Point system based on 100-point limit with each duck having a value of 10, 20, or 90 points depending on species and sex; or D = 5:10 with R = 2:4 wood duck and 1:1 redhead/canvasback, same blue-winged teal bonus as 1969.	Point system similar to Central Flyway; or D = 4:8 or 6:12 (the latter with R = 2:4 mallard), R = 2:4 wood duck and 1:1 redhead/canvasback, same bonuses as 1969.	Point system similar to Central Flyway; or D = 3:6 or 4:8 with R = 1:2 or 2:4 black duck, 2:4 wood duck, and 1:1 redhead/canvasback, and B = 2:4 scaup and/or 2:4 blue-winged teal for designated areas and periods. Same as 1968 on sea ducks.	Same as 1967 except mergansers included with ducks under point system.
1971-72	Same as 1969.	D = 6:12 or 7:7. R = 2:2 canvasback.	Same as 1970 except 100-point category added under point system and R = 2:4 ♀ mallard in Kansas.	Same as 1970 except 100-point category added under point system.	Same as 1970 except 100-point category added under point system and extended sea duck season expanded to include parts of Delaware.	Same as 1970.
1972-73	Same as 1969.	D = 6:12 or 7:7. Closed on canvasback.	Same as 1971 except Kansas under point system, R = 2:4 ♀ mallard, and closed on redhead and canvasback.	Same as 1971 except closed on redhead and canvasback.	Same as 1971 except D = 5:10 with R = 1:2 black duck and 4:8 mallard in some States and closed on redhead and canvasback.	Same as 1970 except closed on canvasback in all flyways.
1973-74	Same as 1969.	D = 5:10 or 6:6. R = 1:1 canvasback except where closed. Closed on Mexican duck in Arizona and New Mexico.	Same as 1972 except point assignments were 10, 20, 70, and 100, closed on Mexican duck in New Mexico and Texas, and R = 1:1 redhead/canvasback or 100 points except where closed.	Same as 1971 except point assignments were 15, 25, 90, and 100, D = 4:8 or 5:10 (the latter with R = 2:4 mallard), and some areas closed on redhead and canvasback.	Same as 1971 except point assignments were 10, 25, 70, and 100, and D = 4:8 or 5:10. Same restrictions, bonuses, etc. as 1971 except closed on redhead and canvasback.	Same as 1970.
1974-75	Same as 1969.	Same as 1973 except D = 5:10, R = 2:4 redhead, and B = 2:4 pintail.	Same as 1973 except point assignments were 15, 35, 70, and 100, R = 3:6 mallard in North Dakota, and closed on tree ducks in Texas.	Same as 1973 except point assignments were 15, 35, 90, and 100, D = 4:8 with R = 2:4 mallard/black duck, and no bonus on blue-winged teal.	Same as 1973.	Same as 1970.

Table A-2. Season dates, season lengths (days), and basic limits (daily bag:possession) for ducks, with mallard limits shown in parentheses when different, for the regular duck hunting season in each State (exclusive of local zoning and boundary exceptions), 1948-1974.

Hunting season	Pacific Flyway																	
	Alaska			Washington			Oregon			Idaho			Montana			Wyoming		
	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits
1948-49	Varying by zone	40	5:10	O 15-O 31 D 23-J 8	34	5:10	O 29-N 14 D 23-J 8	34	5:10	O 29-N 14 D 23-J 8	34	5:10	Entire State in Central Flyway			Entire State in Central Flyway		
1949-50	Varying by zone	50	5:10	N 4-D 23	50	5:10	O 21-N 9 D 19-J 7	40	5:10	O 14-N 2 D 9-D 28	40	5:10						
1950-51	Varying by zone	55	6:6	N 3-D 27	55	6:6	N 3-D 27	55	6:6	N 3-D 27	55	6:6						
1951-52	Varying by zone	55	5:10	O 26-D 24	60	6:6	N 2-D 31	60	6:6	O 19-D 17	60	6:6						
1952-53	Varying by zone	55	5:10	O 17-D 25	70	6:6	O 24-J 1	70	6:6	O 11-D 19	70	6:6						
1953-54	Varying by zone	75	7:14	O 17-D 30	75	7:7	O 17-D 30	75	7:7	O 10-D 23	75	7:7						
1954-55	Varying by zone	75	7:14	O 16-J 3	80	6:12	O 16-J 3	80	6:12	O 16-J 3	80	6:12						
1955-56	S 1-N 22	83	7:14	O 15-J 2	80	6:12	O 22-J 9	80	6:12	O 13-D 31	80	6:12						
1956-57	S 1-N 22	83	7:14	O 13-D 31	80	6:12	O 13-D 31	80	6:12	O 13-D 31	80	6:12						
1957-58	S 1-N 29	90	7:14	O 13-J 15	95	5:10	O 12-J 14	95	5:10	O 5-J 7	95	5:10						
1958-59	S 1-D 3	94	7:14	O 12-J 14	95	5:10	O 11-J 13	95	5:10	O 4-J 6	95	5:10						
1959-60	S 1-D 3	94	7:14	O 7-J 8	94	5:10	O 7-J 8	94	5:10	O 7-J 8	94	5:10						
1960-61	S 1-D 3	94	5:10	O 8-J 5	90	4:8	O 11-J 8	90	4:8	O 11-J 8	90	5:5						
1961-62	S 1-D 14	105	5:10	O 14-D 27	75	4:8	O 21-J 3	75	4:8	O 14-D 27	75	5:5	O 22-D 20	60	5:10			
1962-63	S 1-D 14	105	5:10	O 13-D 26	75	4:8	O 20-J 2	75	4:8	O 17-D 30	75	5:5	O 14-D 27	75	5:5	O 12-D 25	75	4:8
1963-64	S 1-D 14	105	5:10	O 12-J 5	86	4:8	O 8-J 5	90	4:8	O 8-J 5	90	5:5	O 13-D 26	75	5:10	O 5-D 31	88	4:8
1964-65	S 1-D 14	105	5:10	O 10-J 7	90	4:8	O 10-J 7	90	4:8	O 10-J 7	90	5:5	O 11-J 8	90	4:8	O 10-D 23	75	5:10
1965-66	S 1-D 14	105	5:10	O 16-J 9	86	5:5 (3:5)	O 9-J 6	90	4:8 (3:6)	O 9-J 6	90	5:5 (3:5)	O 9-J 6	90	4:8 (3:6)	O 9-J 6	90	5:5 (3:5)
1966-67	S 1-D 14	105	5:10	O 15-J 8	86	5:10	O 8-J 5	90	5:10	O 8-J 5	90	5:10	O 8-J 5	90	6:6	O 8-J 5	90	5:10
1967-68	S 1-D 14	105	6:12	O 14-J 7	86	5:10	O 10-J 7	90	5:10	O 7-J 4	90	6:6	O 7-J 4	90	6:6	O 7-J 4	90	5:10
1968-69	S 1-D 14	105	6:12	O 12-J 5	86	5:10 (3:6)	O 19-J 12	86	5:10 (3:6)	O 12-J 5	86	6:6 (3:3)	O 5-D 29	86	5:10 (3:6)	O 5-D 29	86	6:6 (3:3)
1969-70	S 1-D 14	105	6:18	O 11-J 4	86	5:10	O 18-J 11	86	5:10	O 4-D 28	86	6:6	O 4-D 28	86	5:10	O 4-D 28	86	6:6
1970-71	S 1-D 14	105	6:18	O 10-J 10	93	6:12	O 10-J 10	93	6:12	O 10-J 10	93	7:7	O 10-J 10	93	6:12	O 3-D 31	90	7:7
1971-72	S 1-D 14	105	6:18	O 16-J 16	93	6:12	O 9-J 9	93	6:12	O 9-J 9	93	7:7	O 9-J 9	93	6:12	O 2-D 31	91	6:12
1972-73	S 1-D 14	105	6:18	O 14-J 14	93	6:12	O 14-J 14	93	6:12	O 7-J 7	93	7:7	O 1-J 1	93	6:12	O 1-D 31	92	7:7
1973-74	S 1-D 16	107	6:18	O 13-J 13	93	5:10	O 13-J 13	93	5:10	O 6-J 6	93	6:6	O 6-J 6	93	5:10	O 6-D 30	86	6:6
1974-75	S 1-D 16	107	6:18	O 12-J 12	93	5:10	O 12-J 12	93	5:10	O 5-J 5	93	5:10	S 28-D 29	93	5:10	S 28-D 29	93	5:10

Table A-2.--continued. Season dates, season lengths (days), and basic limits (daily bag:possession) for ducks, with mallard limits shown in parentheses when different, for the regular duck hunting season in each State (exclusive of local zoning and boundary exceptions), 1948-1974.

	Pacific Flyway																					
	California			Nevada			Utah			Colorado			Arizona			New Mexico		
Hunting season	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits
1948-49	O 15-O 31 D 23-J 8	34	5:10	O 15-N 23	40	5:10	O 29-D 7	40	5:10	Entire State in Central Flyway			O 8-O 24 N 30-D 16	34	5:10	Entire State in Central Flyway		
1949-50	O 21-N 9 D 19-J 7	40	5:10	O 14-D 2	50	5:10	O 14-D 2	50	5:10				N 18-J 6	50	5:10			
1950-51	O 20-N 10 D 15-J 5	44	6:6	O 13-N 3 D 8-D 29	44	6:6	O 13-N 3 N 24-D 15	44	6:6				N 12-J 5	55	6:6			
1951-52	O 26-D 24	60	6:6	O 19-D 17	60	6:6	O 12-D 10	60	6:6				N 7-J 5	60	6:6			
1952-53	O 24-J 1	70	6:6	O 17-D 25	70	6:6	O 17-D 25	70	6:6				O 24-J 1	70	6:6			
1953-54	O 16-N 18 D 8-J 10	68	7:7	O 16-D 29	75	7:7	O 10-D 23	75	7:7				O 16-N 18 D 8-J 10	68	7:7			
1954-55	O 9-N 13 D 6-J 10	72	7:7	O 8-D 26	80	7:7	O 8-D 26	80	6:12				O 23-J 10	72	7:7			
1955-56	O 15-N 18 D 10-J 15	72	7:7	O 15-J 2	80	6:12	O 15-J 2	80	6:12				O 28-J 15	80	6:12			
1956-57	O 20-J 7	80	7:7	O 13-D 31	80	6:12	O 13-D 31	80	6:12				O 28-J 15	80	6:12			
1957-58	O 12-J 14	95	6:6	O 5-J 7	95	5:10	O 5-J 7	95	5:10				O 12-J 14	95	5:10			
1958-59	O 11-J 13	95	6:6	O 11-J 13	95	5:10	O 4-J 6	95	5:10				O 11-J 13	95	5:10			
1959-60	O 7-J 8	94	5:10	O 9-J 8	92	5:10	O 7-J 8	94	5:10				O 7-J 8	94	5:10			
1960-61	O 15-N 20 D 10-J 8	67	6:6	O 15-J 8	86	4:8	O 8-J 5	90	5:5				O 11-J 8	90	4:8			
1961-62	O 14-N 20 D 9-J 7	68	5:5	O 21-D 24	65	5:5	O 14-D 27	75	5:5				O 7-N 5 D 1-J 7	68	4:8			
1962-63	O 13-N 19 D 8-J 6	68	5:5	O 13-D 16	65	4:8	O 13-D 26	75	5:5	O 12-D 25	75	4:8	O 6-O 29 N 24-J 6	68	5:5	O 6-D 19	75	4:8
1963-64	O 23-J 5	75	6:6	O 11-J 5	87	4:8	O 5-J 2	90	5:5	O 5-J 2	90	4:8	O 8-J 5	90	5:5	O 12-J 5	86	4:8
1964-65	O 24-J 6	75	6:6	O 10-D 23	75	5:10	O 10-J 7	90	5:5	O 13-J 10	90	4:8	O 13-J 10	90	5:5	O 10-D 23	75	5:10
1965-66	O 23-J 5	75	5:10 (3:6)	O 16-J 9	86	4:8 (3:6)	O 9-J 6	90	5:5 (3:5)	O 12-J 9	90	4:8 (3:6)	O 12-J 9	90	5:5 (3:5)	O 16-D 29	75	5:10 (3:6)
1966-67	O 22-J 4	75	7:7	O 15-D 28	75	6:12	O 8-J 5	90	5:10	O 11-J 8	90	5:10	O 11-J 8	90	5:10	O 8-D 21	75	6:12
1967-68	O 14-J 7	86	6:6	O 7-D 20	75	6:12	O 7-J 4	90	5:10	O 7-J 4	90	5:10	O 10-J 7	90	5:10	O 7-J 4	90	5:10
1968-69	O 19-J 12	86	6:6 (3:3)	O 19-J 12	86	5:10 (3:6)	O 12-J 5	86	5:10 (3:6)	O 12-J 5	86	5:10 (3:6)	O 19-J 12	86	5:10 (3:6)	O 5-D 29	86	5:10 (3:6)
1969-70	Varying by Zone		6:6	O 4-D 28	86	5:10	O 11-J 4	86	5:10	O 11-J 4	86	5:10	O 18-J 11	86	5:10	O 4-D 28	86	5:10
1970-71	Varying by Zone		7:7	O 3-J 3	93	6:12	O 3-J 3	93	6:12	O 10-J 10	93	6:12	O 3-N 11 N 26-J 17	93	6:12	O 17-J 17	93	6:12
1971-72	Varying by Zone		7:7	O 2-J 2	93	6:12	O 2-J 2	93	6:12	O 2-J 2	93	6:12	O 16-J 16	93	6:12	O 16-J 16	93	6:12
1972-73	Varying by zone	93	7:7	O 7-J 7	93	6:12	O 7-J 7	93	6:12	O 1-O 13 N 2-J 20	93	6:12	O 1-O 23 N 12-J 20	93	6:12	O 21-J 20	92	6:12
1973-74	Varying by zone	93	6:6	O 6-J 6	93	5:10	O 6-J 6	93	5:10	S 29-O 12 N 3-J 20	93	5:10	O 1-O 28 N 17-J 20	93	5:10	O 20-J 20	93	5:10
1974-75	Varying by zone	93	5:10	O 12-J 12	93	5:10	O 5-J 5	93	5:10	S 28-O 11 N 2-J 19	93	5:10	S 28-O 25 N 16-J 19	93	5:10	O 12-J 12	93	5:10

Table A-2.--continued. Season dates, season lengths (days), and basic limits (daily bag:possession) for ducks, with mallard limits shown in parentheses when different, for the regular duck hunting season in each State (exclusive of local zoning and boundary exceptions), 1948-1974.

	Central Flyway																							
	Montana			North Dakota			South Dakota			Wyoming			Nebraska			Colorado			Kansas		
Hunting season	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits
1948-49	O 8-O 21 N 12-N 25	28	5:10	O 8-N 11	35	5:10	O 15-N 18	35	5:10	O 8-O 21 N 30-D 13	28	5:10	O 15-N 18	35	5:10	N 12-D 16	35	5:10	O 15-O 28 N 12-N 25	28	5:10
1949-50	O 7-O 24 N 18-D 5	36	4:8	O 7-N 20	45	4:8	O 21-D 4	45	4:8	O 7-O 24 N 24-D 11	36	4:8	O 21-D 4	45	4:8	O 14-N 27	45	4:8	O 21-D 4	45	4:8
1950-51	O 6-O 23 N 17-D 4	36	5:10	O 6-N 19	45	5:10	O 6-N 19	45	5:10	O 6-O 23 N 24-D 11	36	5:10	O 20-D 3	45	5:10	O 6-O 23 D 19-J 5	36	5:10	O 20-D 3	45	5:10
1951-52	O 12-N 30	50	5:10	O 5-N 23	50	5:10	O 5-N 23	50	5:10	O 12-N 30	50	5:10	O 19-D 7	50	5:10	O 19-N 7 D 14-J 2	40	5:10	O 19-D 7	50	5:10
1952-53	O 10-D 8	60	5:10	O 1-N 29	60	5:10	O 3-D 1	60	5:10	O 17-D 15	60	5:10	O 11-D 9	60	5:10	O 20-D 18	60	5:10	O 12-D 10	60	5:10
1953-54	O 10-D 8	60	5:10	O 1-N 29	60	5:10	O 2-N 30	60	5:10	O 10-D 8	60	5:10	O 16-D 14	60	5:10	O 20-D 18	60	5:10	O 23-D 21	60	5:10
1954-55	O 9-D 7	60	5:10	O 1-N 29	60	5:10	O 1-N 29	60	5:10	O 10-D 8	60	5:10	O 8-D 6	60	5:10	N 1-D 30	60	5:10	O 21-D 19	60	5:10
1955-56	O 8-D 21	75	5:10	O 1-D 14	75	5:10	O 1-D 14	75	5:10	O 18-D 31	75	5:10	O 8-D 21	75	5:10	O 25-J 7	75	5:10	O 9-D 22	75	5:10
1956-57	O 6-D 19	75	5:10	O 1-D 14	75	5:10	O 1-D 14	75	5:10	O 11-D 24	75	5:10	O 5-D 18	75	5:10	O 25-J 7	75	5:10	O 7-D 20	75	5:10
1957-58	O 5-D 18	75	5:10	O 1-D 14	75	5:10	O 5-D 18	75	5:10	O 11-D 24	75	5:10	O 5-D 18	75	5:10	O 18-D 31	75	5:10	O 12-D 25	75	5:10
1958-59	O 11-D 24	75	5:10	O 1-D 14	75	5:10	O 1-D 29	90	4:8	O 11-D 24	75	5:10	O 1-D 29	90	4:8	O 10-J 7	90	4:8	O 11-J 8	90	4:8
1959-60	O 16-D 4	50	4:8	O 7-N 25	50	4:8	O 7-D 5	60	3:6	O 16-D 14	60	3:6	O 10-D 8	60	3:6	O 26-D 14	50	4:8	O 17-D 15	60	3:6
1960-61	O 8-N 26	50	4:8	O 7-N 25	50	4:8	O 7-N 25	50	4:8	O 15-D 13	60	3:6	O 8-N 26	50	4:8	O 26-D 24	60	3:6	O 15-D 13	60	3:6
1961-62	O 13-N 11	30	3:6	O 14-N 12	30	3:6	O 18-N 26	40	2:4	O 20-N 28	40	2:4	O 28-D 6	40	2:4	N 22-D 21	30	3:6	O 28-N 26	30	3:6
1962-63	O 14-N 7	25	2:4 (1:2)	O 12-N 5	25	2:4 (1:2)	O 19-N 12	25	2:4 (1:2)	O 22-N 15	25	2:4 (1:2)	O 20-N 13	25	2:4 (1:2)	N 9-D 3	25	2:4 (1:2)	N 3-N 27	25	2:4 (1:2)
1963-64	O 13-N 16	35	4:8 (2:4)	O 5-N 8	35	4:8 (2:4)	O 12-N 15	35	4:8 (2:4)	N 2-D 6	35	4:8 (2:4)	O 5-O 13 N 16-D 8	32	4:8 (2:4)	N 15-D 19	35	4:8 (2:4)	O 26-N 29	35	4:8 (2:4)
1964-65	O 4-N 12	40	4:8 (2:4)	O 9-N 17	40	4:8 (2:4)	O 15-N 23	40	4:8 (2:4)	O 17-O 31 D 5-D 25	36	4:8 (2:4)	O 3-O 18 N 21-D 10	36	4:8 (2:4)	N 21-D 30	40	4:8 (2:4)	O 10-O 25 D 5-D 24	36	4:8 (2:4)
1965-66	O 9-O 26 N 24-D 11	36	4:8 (1:2)	O 9-N 17	40	4:8 (1:2)	O 9-N 17	40	4:8 (1:2)	O 9-N 17	40	4:8 (1:2)	O 20-N 28	40	4:8 (1:2)	O 16-N 2 D 4-D 21	36	4:8 (1:2)	O 23-D 1	40	4:8 (1:2)
1966-67	O 8-D 6	60	3:6 (2:4)	O 8-N 26	50	4:8 (2:4)	O 8-D 6	60	3:6 (2:4)	O 8-N 7 D 17-J 8	54	3:6 (2:4)	O 15-D 13	60	3:6 (2:4)	O 22-D 20	60	3:6 (2:4)	O 29-N 27 D 10-J 2	54	3:6 (2:4)
1967-68	O 7-D 5	60	3:6 (2:4)	O 7-N 25	50	4:8 (2:4)	O 7-D 5	60	3:6 (2:4)	O 7-N 6 D 16-J 7	54	3:6 (2:4)	O 7-D 5	60	3:6 (2:4)	O 28-D 26	60	3:6 (2:4)	O 21-N 19 D 9-D 23	45	4:8 (2:4)
1968-69	O 12-N 13	33	3:6 (2:4)	O 5-N 3	30	4:8 (2:4)	O 5-O 22 N 11-N 28	36	3:6 (2:4)	O 19-N 20	33	3:6 (2:4)	O 12-O 20 N 16-D 12	36	3:6 (2:4)	O 26-N 27	33	3:6 (2:4)	N 2-D 1	30	4:8 (2:4)
1969-70	O 4-N 5	33	4:8 (2:4)	O 4-N 12	40	4:8 (2:4)	O 11-N 19	40	4:8 (2:4)	O 11-N 12	33	4:8 (2:4)	O 18-N 26	40	4:8 (2:4)	O 25-N 26	33	4:8 (2:4)	O 25-N 20 D 20-D 28	36	4:8 (2:4)
1970-71	O 3-D 31	90	Point System	O 3-D 11	70	5:10	Varying by zone		Point System	O 3-O 31 N 18-J 17	90	Point System	Varying by zone		Point System	O 17-J 14	90	Point System	O 17-D 13 D 20-D 31	70	5:10
1971-72	O 2-D 30	90	Point System	O 1-D 9	70	5:10	Varying by zone		Point System	O 2-N 7 N 20-J 11	90	Point System	Varying by zone		Point System	O 2-O 14 N 1-J 16	90	Point System	O 16-D 12 D 18-D 29	70	5:10 (2:4?)
1972-73	O 1-D 29	90	Point System	O 1-D 9	70	5:10 (2:4?)	Varying by zone		Point System	O 1-N 5 N 23-J 15	90	Point System	Varying by zone		Point System	O 1-O 11 O 28-J 14	90	Point System	Varying by zone		Point System
1973-74	S 29-N 27 D 15-D 30	76	Point System	S 29-N 18	51	5:10 (2:4?)	Varying by zone		Point System	O 6-N 4 N 22-J 6	76	Point System	Varying by zone		Point System	S 29-O 9 N 10-J 13	76	Point System	Varying by zone		Point System
1974-75	S 28-N 15 D 21-J 5	65	Point System	S 28-N 17	51	5:10 (3:6)	Varying by zone		Point System	O 12-N 3 N 18-D 29	65	Point System	Varying by zone		Point System	O 5-O 13 N 9-J 3	65	Point System	Varying by zone		Point System

Table A-2.--continued. Season dates, season lengths (days), and basic limits (daily bag:possession) for ducks, with mallard limits shown in parentheses when different, for the regular duck hunting season in each State (exclusive of local zoning and boundary exceptions), 1948-1974.

Hunting season	Central Flyway									Mississippi Flyway												
	New Mexico			Oklahoma			Texas			Minnesota			Wisconsin			Michigan			Iowa		
	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits
1948-49	O 8-O 21 D 23-J 5	28	5:10	O 29-D 2	35	5:10	N 12-D 16	35	5:10	O 8-N 6	30	4:8	O 15-N 13	30	4:8	O 15-N 13	30	4:8	O 29-N 27	30	4:8
1949-50	O 14-O 31 D 21-J 7	36	4:8	O 21-D 4	45	4:8	N 4-N 21 D 21-J 7	36	4:8	O 7-N 15	40	4:8	O 14-N 22	40	4:8	O 7-N 15	40	4:8	O 21-N 29	40	4:8
1950-51	O 13-O 30 D 19-J 5	36	5:10	N 3-D 17	45	5:10	N 3-D 17	45	5:10	O 6-N 9	35	4:8	O 14-N 16	34	4:8	O 13-N 16	35	4:8	O 20-N 23	35	4:8
1951-52	O 12-O 31 D 17-J 5	40	5:10	O 19-D 7	50	5:10	N 9-D 28	50	5:10	O 5-N 18	45	4:8	O 13-N 25	44	4:8	O 12-N 25	45	4:8	O 12-N 25	45	4:8
1952-53	O 14-N 6 D 18-J 10	48	5:10	O 18-D 16	60	5:10	O 31-D 29	60	5:10	O 1-N 24	55	4:8	O 4-N 27	55	4:8	O 1-N 24	55	4:8	O 8-D 1	55	4:8
1953-54	O 31-D 29	60	5:10	O 17-D 15	60	5:10	N 6-J 4	60	5:10	O 3-N 26	55	4:8	O 3-N 26	55	4:8	O 1-N 24	55	4:8	O 8-D 1	55	4:8
1954-55	N 12-J 10	60	5:10	O 27-D 25	60	5:10	N 5-J 3	60	5:10	O 2-N 25	55	4:8	O 2-N 25	55	4:8	O 1-N 24	55	4:8	O 15-D 8	55	4:8
1955-56	N 2-J 15	75	5:10	O 22-J 4	75	5:10	N 2-J 15	75	5:10	O 8-D 16	70	4:8	O 1-D 9	70	4:8	O 1-D 9	70	4:8	O 8-D 16	70	4:8
1956-57	N 2-J 15	75	5:10	O 19-J 1	75	5:10	N 2-J 15	75	5:10	O 6-N 29	55	5:10	O 1-D 9	70	4:8	O 1-D 9	70	4:8	O 6-D 14	70	4:8
1957-58	N 2-J 15	75	5:10	O 19-J 1	75	5:10	N 1-J 14	75	5:10	O 5-D 13	70	4:8	O 1-D 9	70	4:8	O 1-D 9	70	4:8	O 5-D 13	70	4:8
1958-59	N 2-J 15	75	5:10	O 18-J 15	90	4:8	N 1-J 14	75	5:10	O 4-D 12	70	4:8	O 1-D 9	70	4:8	O 1-D 9	70	4:8	O 4-D 12	70	4:8
1959-60	N 20-J 8	50	4:8	O 20-D 18	60	3:6	N 13-J 1	50	4:8	O 7-N 25	50	3:6	O 7-N 25	50	3:6	O 7-N 15	40	4:8	O 20-D 8	50	3:6
1960-61	N 20-J 8	50	4:8	O 20-D 18	60	3:6	N 11-D 30	50	4:8	O 8-N 16	40	4:8	O 7-N 25	50	3:6	O 7-N 15	40	4:8	O 15-D 3	50	3:6
1961-62	O 13-O 25 D 15-D 28	27	3:6	N 1-N 30	30	3:6	N 18-D 17	30	3:6	O 14-N 12	30	2:4	O 14-N 12	30	2:4	O 13-N 11	30	2:4	O 21-N 19	30	2:4
1962-63	D 6-D 30	25	2:4 (1:2)	N 8-D 2	25	2:4 (1:2)	D 6-D 30	25	2:4 (1:2)	O 13-N 6	25	2:4 (1:2)	O 13-N 6	25	2:4 (1:2)	O 12-N 5	25	2:4 (1:2)	O 27-N 20	25	2:4 (1:2)
1963-64	N 29-J 2	35	4:8 (2:4)	N 8-D 12	35	4:8 (2:4)	D 1-J 4	35	4:8 (2:4)	O 5-N 8	35	3:6 (2:4)	O 5-N 8	35	4:8 (2:4)	O 5-N 8	35	4:8 (2:4)	O 5-O 13 O 26-N 17	32	4:8 (2:4)
1964-65	N 21-D 30	40	4:8 (2:4)	O 24-N 4 D 11-J 3	36	4:8 (2:4)	N 25-J 3	40	4:8 (2:4)	O 3-N 11	40	4:8 (2:4)	O 10-N 18	40	4:8 (2:4)	O 8-N 16	40	4:8 (2:4)	O 3-O 4 O 24-N 26	36	4:8 (2:4)
1965-66	N 20-D 29	40	4:8 (1:2)	O 23-D 1	40	4:8 (1:2)	N 24-J 2	40	4:8 (1:2)	O 9-N 17	40	4:8 (1:2)	O 9-N 17	40	4:8 (1:2)	O 11-N 19	40	4:8 (1:2)	O 23-D 1	40	4:8 (1:2)
1966-67	N 19-J 7	50	4:8 (2:4)	O 29-D 27	60	3:6 (2:4)	N 19-J 7	50	4:8 (2:4)	O 8-N 21	45	4:8 (2:4)	O 8-N 21	45	4:8 (2:4)	O 10-N 23	45	4:8 (2:4)	O 15-N 28	45	4:8 (2:4)
1967-68	N 11-J 7	58	3:6 (2:4)	O 14-D 12	60	3:6 (2:4)	N 18-J 6	50	4:8 (2:4)	O 7-N 15	40	4:8 (2:4)	O 7-N 15	40	4:8 (2:4)	O 9-N 17	40	4:8 (2:4)	O 21-N 29	40	4:8 (2:4)
1968-69	N 23-J 1	40	3:6 (2:4)	N 15-N 30 D 13-J 1	36	3:6 (2:4)	D 14-J 12	30	4:8 (2:4)	O 5-O 13 O 26-N 12	27	3:6 (1:2)	O 12-N 10	30	3:6 (1:2)	O 10-N 8	30	3:6 (1:2)	O 26-N 24	30	3:6 (1:2)
1969-70	N 1-D 3	33	4:8 (2:4)	O 25-N 11 D 20-J 6	36	4:8 (2:4)	N 18-J 11	55	4:8 (1:2)	O 4-N 12	40	4:8 (1:2)	O 4-N 12	40	4:8 (1:2)	O 10-N 18	40	4:8 (1:2)	O 25-N 23	30	4:8 (2:4)
1970-71	O 24-J 17	86	Point System	O 17-N 29 D 12-J 6	70	Point System	N 4-J 12	70	Point System	O 3-N 16	45	4:8	O 3-N 26	55	6:12 (2:4)	O 7-N 30	55	6:12 (2:4)	O 3-N 26	55	Point System
1971-72	O 23-J 16	86	Point System	O 16-N 25 D 11-J 8	70	Point System	N 3-J 11	70	Point System	O 2-N 20	50	4:8	O 2-N 20	50	4:8	O 1-N 19	50	Point System	O 2-N 20	50	Point System
1972-73	O 28-J 24	89	Point System	Varying by zone		Point System	Varying by zone		Point System	O 1-N 19	50	4:8	O 7-N 25	50	4:8	O 6-N 24	50	Point System	O 7-O 12 O 21-D 3	50	Point System
1973-74	N 6-J 20	76	Point System	Varying by zone		Point System	Varying by zone		Point System	O 1-O 10 O 20-N 18	40	4:8 (1:2?)	O 1-O 7 O 13-N 19	45	Point System	O 10-N 23	45	Point System	O 6-O 10 O 20-N 28	45	Point System
1974-75	N 16-J 19	65	Point System	Varying by zone		Point System	Varying by zone		Point System	O 2-N 15	45	4:8 (2:4)	O 2-N 20	50	Point System	Varying by zone		Point System	O 5-O 12 O 26-D 1	45	Point System

Table A-2.--continued. Season dates, season lengths (days), and basic limits (daily bag:possession) for ducks. with mallard limits shown in parentheses when different, for the regular duck hunting season in each State (exclusive of local zoning and boundary exceptions), 1948-1974.

	Mississippi Flyway																							
	Illinois			Indiana			Ohio			Missouri			Kentucky			Arkansas			Tennessee					
Hunting season	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits			
1948-49	O 29-N 27	30	4:8	O 29-N 27	30	4:8	O 29-N 27	30	4:8	O 29-N 27	30	4:8	D 10-J 8	30	4:8	N 26-D 25	30	4:8	D 10-J 8	30	4:8			
1949-50	N 4-D 13	40	4:8	N 4-D 13	40	4:8	O 21-N 29	40	4:8	N 4-D 13	40	4:8	N 29-J 7	40	4:8	N 18-D 27	40	4:8	N 18-D 27	40	4:8			
1950-51	N 3-D 7	35	4:8	N 3-D 7	35	4:8	O 20-N 23	35	4:8	N 3-D 7	35	4:8	D 1-J 4	35	4:8	D 2-J 5	35	4:8	D 2-J 5	35	4:8			
1951-52	O 26-D 9	45	4:8	O 26-D 9	45	4:8	O 19-D 2	45	4:8	O 26-D 9	45	4:8	N 22-J 5	45	4:8	N 22-J 5	45	4:8	N 22-J 5	45	4:8			
1952-53	O 20-D 13	55	4:8	O 20-D 13	55	4:8	O 13-D 6	55	4:8	O 20-D 13	55	4:8	N 17-J 10	55	4:8	N 17-J 10	55	4:8	N 17-J 10	55	4:8			
1953-54	O 23-D 16	55	4:8	O 23-D 16	55	4:8	O 19-D 12	55	4:8	O 23-D 16	55	4:8	N 17-J 10	55	4:8	N 17-J 10	55	4:8	N 17-J 10	55	4:8			
1954-55	O 22-D 15	55	4:8	O 29-D 22	55	4:8	O 18-D 11	55	4:8	O 22-D 15	55	4:8	N 17-J 10	55	4:8	N 17-J 10	55	4:8	N 17-J 10	55	4:8			
1955-56	O 15-D 23	70	4:8	O 22-D 30	70	4:8	O 18-D 26	70	4:8	O 28-J 5	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8			
1956-57	O 13-D 21	70	4:8	O 20-D 28	70	4:8	O 15-D 22	69	4:8	O 26-J 3	70	4:8	N 3-J 11	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8			
1957-58	O 19-D 27	70	4:8	O 26-J 3	70	4:8	O 18-D 26	70	4:8	O 25-J 2	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8			
1958-59	O 18-D 26	70	4:8	O 25-J 2	70	4:8	O 24-J 1	70	4:8	O 24-J 1	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8			
1959-60	O 30-D 8	40	4:8	N 6-N 28 D 18-J 8	45	3:6	O 16-N 24	40	4:8	N 6-D 25	50	3:6	N 30-J 8	40	4:8	N 30-J 8	40	4:8	N 30-J 8	40	4:8			
1960-61	O 28-D 6	40	4:8	N 4-N 26 D 16-J 6	45	3:6	O 20-N 24 D 23-D 31	45	3:6	N 1-D 20	50	3:6	N 30-J 8	40	4:8	N 23-J 1	40	4:8	N 30-J 8	40	4:8			
1961-62	O 28-N 26	30	2:4	N 9-N 25 D 21-D 30	27	2:4	O 20-N 18	30	2:4	N 3-D 2	30	2:4	D 1-D 30	30	2:4	N 24-D 23	30	2:4	D 1-D 30	30	2:4			
1962-63	O 26-N 19	25	2:4 (1:2)	N 2-N 26	25	2:4 (1:2)	O 17-N 10	25	2:4 (1:2)	N 2-N 26	25	2:4 (1:2)	D 6-D 30	25	2:4 (1:2)	D 6-D 30	25	2:4 (1:2)	D 6-D 30	25	2:4 (1:2)			
1963-64	N 1-D 5	35	4:8 (2:4)	N 8-N 30 D 20-D 28	32	4:8 (2:4)	O 21-N 15 D 23-D 28	32	4:8 (2:4)	O 25-N 28	35	4:8 (2:4)	D 1-J 4	35	4:8 (2:4)	D 2-J 5	35	4:8 (2:4)	D 2-J 5	35	4:8 (2:4)			
1964-65	O 31-D 9	40	4:8 (2:4)	O 31-N 26 D 25-J 2	36	4:8 (2:4)	O 19-N 18 D 29-J 2	36	4:8 (2:4)	O 30-D 8	40	4:8 (2:4)	N 25-J 3	40	4:8 (2:4)	N 25-J 3	40	4:8 (2:4)	N 25-J 3	40	4:8 (2:4)			
1965-66	O 30-D 8	40	4:8 (1:2)	O 30-N 24 D 23-J 1	36	4:8 (1:2)	O 21-N 20 D 28-J 1	36	4:8 (1:2)	O 29-D 7	40	4:8 (1:2)	D 1-J 9	40	4:8 (1:2)	N 25-J 3	40	4:8 (1:2)	D 1-J 9	40	4:8 (1:2)			
1966-67	O 22-D 5	45	4:8 (2:4)	O 29-N 26 D 22-J 2	41	4:8 (2:4)	O 22-N 26 D 27-D 31	41	4:8 (2:4)	N 1-D 15	45	4:8 (2:4)	N 25-J 8	45	4:8 (2:4)	N 24-J 7	45	4:8 (2:4)	N 25-J 8	45	4:8 (2:4)			
1967-68	O 28-D 6	40	4:8 (2:4)	N 7-N 29 D 23-J 1	33	4:8 (2:4)	O 17-N 25	40	4:8 (2:4)	N 1-D 10	40	4:8 (2:4)	N 29-J 7	40	4:8 (2:4)	N 22-D 31	40	4:8 (2:4)	N 29-J 7	40	4:8 (2:4)			
1968-69	N 2-D 1	30	3:6 (1:2)	N 2-N 20 D 21-D 28	27	3:6 (1:2)	O 14-O 26 N 18-N 30	26	3:6 (1:2)	N 1-N 30	30	3:6 (1:2)	D 3-J 1	30	3:6 (1:2)	D 6-D 25	20	3:6 (2:4)	D 7-J 5	30	3:6 (1:2)			
1969-70	N 1-N 30	30	4:8 (2:4)	N 1-N 18 D 20-D 28	27	4:8 (2:4)	O 21-N 29	40	4:8 (1:2)	N 1-N 30	30	4:8 (2:4)	N 28-D 27	30	4:8 (2:4)	N 29-D 28	30	4:8 (2:4)	D 6-J 4	30	4:8 (2:4)			
1970-71	O 17-D 10	55	Point System	O 24-D 17	55	6:12 (2:4)	O 16-D 3 D 28-J 2	55	6:12 (2:4)	O 24-D 17	55	6:12 (2:4)	D 4-J 17	45	4:8	N 27-J 10	45	4:8	D 4-J 17	45	4:8			
1971-72	O 23-D 11	50	Point System	O 30-D 8 D 24-J 2	50	4:8	O 22-D 4 D 27-J 1	50	6:12 (2:4)	O 31-D 19	50	4:8	N 28-J 16	50	4:8	N 20-J 8	50	4:8	N 13-N 21 D 7-J 16	50	4:8			
1972-73	O 28-D 16	50	Point System	N 3-D 10 D 23-J 3	50	4:8	O 19-D 2 D 26-D 30	50	6:12 (2:4)	O 29-D 17	50	4:8	D 2-J 20	50	4:8	N 25-J 13	50	4:8	N 25-J 13	50	4:8			
1973-74	O 20-D 3	45	Point System	N 3-D 3 D 22-D 30	40	4:8	O 19-N 24 D 26-J 2	45	Point System	N 1-D 15	45	Point System	D 12-J 20	40	4:8	N 24-D 8 D 26-J 19	40	4:8	D 12-J 20	40	4:8			
1974-75	O 23-D 11	50	Point System	O 30-D 1 D 18-D 29	45	4:8 (2:4)	O 16-N 30 J 1-J 4	50	Point System	O 30-D 18	50	Point System	N 20-N 28 D 11-J 20	50	Point System	N 20-D 7 D 18-J 18	50	Point System	N 20-D 1 D 11-J 17	50	Point System			

Table A-2.--continued. Season dates, season lengths (days), and basic limits (daily bag:possession) for ducks, with mallard limits shown in parentheses when different, for the regular duck hunting season in each State (exclusive of local zoning and boundary exceptions), 1948-1974.

	Mississippi Flyway									Atlantic Flyway												
	Louisiana			Mississippi			Alabama			Maine			Vermont			New Hampshire			Massachusetts			
Hunting season	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	
1948-49	N 12-D 11	30	4:8	D 10-J 8	30	4:8	N 26-D 25	30	4:8	O 8-O 19 N 26-D 7	24	4:8	O 15-N 13	30	4:8	O 8-O 19 N 26-D 7	24	4:8	O 29-N 9 D 28-J 8	24	4:8	
1949-50	N 18-D 27	40	4:8	N 18-D 27	40	4:8	N 29-J 7	40	4:8	O 7-O 22 N 23-D 8	32	4:8	O 21-N 29	40	4:8	O 7-O 22 N 18-D 3	32	4:8	O 21-N 5 D 9-D 24	32	4:8	
1950-51	D 2-J 5	35	4:8	D 2-J 5	35	4:8	D 2-J 5	35	4:8	O 6-O 21 N 24-D 9	32	4:8	O 20-N 28	40	4:8	O 6-O 21 N 17-D 2	32	4:8	O 20-N 4 D 15-D 30	32	4:8	
1951-52	N 2-D 16	45	4:8	N 22-J 5	45	4:8	N 22-J 5	45	4:8	O 5-O 22 N 23-D 10	36	4:8	O 12-N 25	45	4:8	O 5-O 22 N 16-D 3	36	4:8	O 26-D 9	45	4:8	
1952-53	N 5-D 29	55	4:8	N 17-J 10	55	4:8	N 17-J 10	55	4:8	O 1-O 22 N 19-D 10	44	4:8	O 7-N 30	55	4:8	O 10-D 3	55	4:8	N 7-D 31	55	4:8	
1953-54	N 17-J 10	55	4:8	N 17-J 10	55	4:8	N 17-J 10	55	4:8	O 9-D 7	60	4:8	O 5-D 3	60	4:8	O 1-N 29	60	4:8	O 28-D 26	60	4:8	
1954-55	N 1-N 25 D 17-J 10	50	4:8	N 17-J 10	55	4:8	N 17-J 10	55	4:8	O 4-O 30 N 19-D 15	54	4:8	O 10-D 8	60	4:8	O 12-D 10	60	4:8	O 27-D 25	60	4:8	
1955-56	N 5-J 13	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	O 7-D 15	70	4:8	O 5-D 13	70	4:8	O 7-D 15	70	4:8	O 21-D 29	70	4:8	
1956-57	N 1-N 25 D 7-J 13	63	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	O 5-D 13	70	4:8	O 5-D 13	70	4:8	O 5-D 13	70	4:8	O 20-D 28	70	4:8	
1957-58	N 2-J 10	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	O 4-D 12	70	4:8	O 10-D 18	70	4:8	O 5-D 13	70	4:8	O 26-J 3	70	4:8	
1958-59	N 1-J 9	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	O 10-D 8	60	4:8	O 10-D 8	60	4:8	O 10-D 8	60	4:8	O 20-N 8 D 8-J 10	54	4:8	
1959-60	N 26-J 4	40	4:8	N 20-J 8	50	3:6	N 25-J 3	40	4:8	O 9-N 7 N 21-D 5	45	3:6	O 10-N 28	50	3:6	O 9-O 30 N 20-D 12	45	3:6	O 20-N 11 D 14-J 4	45	3:6	
1960-61	N 4-N 15 D 16-J 8	36	4:8	N 19-J 7	50	3:6	N 23-J 1	40	4:8	O 7-O 29 N 19-D 10	45	3:6	O 7-N 25	50	3:6	O 15-D 3	50	3:6	O 29-N 26 D 16-D 31	45	3:6	
1961-62	N 10-N 29	20	3:6	D 1-D 30	30	2:4	D 11-D 30	20	3:6	O 13-O 21 N 4-D 9	45	2:4	O 14-N 22	40	3:6	O 13-D 1	50	2:4	O 18-N 11 D 11-D 30	45	2:4	
1962-63	N 30-D 24	25	2:4 (1:2)	D 6-D 30	25	2:4 (1:2)	D 5-D 29	25	2:4 (1:2)	O 12-N 3 N 17-D 8	45	2:4	O 12-N 20	40	3:6 (2:4)	O 12-O 31 N 25-D 10	36	3:6 (2:4)	O 12-O 27 D 1-D 29	45	2:4	
1963-64	N 29-J 2	35	4:8 (2:4)	D 2-J 5	35	4:8 (2:4)	D 2-J 5	35	4:8 (2:4)	O 5-O 26 N 22-D 14	45	3:6 (2:4)	O 11-O 27 N 11-D 8	45	3:6 (2:4)	O 11-N 29	50	3:6 (2:4)	O 18-N 2 N 29-D 27	45	3:6 (2:4)	
1964-65	N 21-D 30	40	4:8 (2:4)	N 25-J 3	40	4:8 (2:4)	N 25-J 3	40	4:8 (2:4)	O 3-O 24 N 20-D 12	45	3:6 (2:4)	O 10-N 28	50	3:6 (2:4)	O 10-N 28	50	3:6 (2:4)	O 17-O 31 N 27-D 26	45	3:6 (2:4)	
1965-66	D 1-J 9	40	4:8 (1:2)	D 1-J 9	40	4:8 (1:2)	D 1-J 9	40	4:8 (1:2)	O 9-O 30 N 12-D 4	45	3:6 (2:4)	O 16-D 4	50	3:6 (2:4)	O 9-O 31 N 20-D 11	45	3:6 (2:4)	O 16-N 6 D 10-J 1	45	3:6 (2:4)	
1966-67	N 18-J 1	45	4:8 (2:4)	N 25-J 8	45	4:8 (2:4)	N 24-J 7	45	4:8 (2:4)	O 8-D 1	55	3:6	O 8-D 1	55	3:6	O 8-D 1	55	3:6	O 15-D 8	55	3:6	
1967-68	N 18-D 27	40	4:8 (2:4)	N 29-J 7	40	4:8 (2:4)	N 29-J 7	40	4:8 (2:4)	O 7-N 11 D 11-D 19	45	3:6	O 7-N 4 N 25-D 10	45	3:6	O 7-N 5 D 9-D 23	45	3:6	O 20-N 25 D 12-D 19	45	3:6	
1968-69	D 14-J 12	30	3:6 (1:2)	D 17-J 15	30	3:6 (1:2)	D 17-J 15	30	3:6 (1:2)	O 5-O 26 N 15-D 7	45	3:6 (2:4)	O 12-N 30	50	3:6 (2:4)	O 12-N 30	50	3:6 (2:4)	O 12-O 19 N 22-D 28	45	3:6 (2:4)	
1969-70	N 15-D 24	40	4:8 (1:2)	D 13-J 11	30	4:8 (2:4)	D 17-J 15	30	4:8 (2:4)	O 4-O 25 N 14-D 6	45	3:6	O 11-N 29	50	3:6	O 4-O 26 N 22-D 13	45	3:6	O 20-D 8	50	3:6	
1970-71	N 7-N 29 D 12-J 12	55	6:12 (2:4)	N 14-N 28 D 19-J 17	45	4:8	N 23-J 16	55	6:12 (2:4)	O 3-O 24 N 14-D 11	50	4:8	O 10-N 28	50	4:8	O 3-O 25 N 21-D 17	50	4:8	O 17-O 31 N 22-D 26	50	4:8	
1971-72	N 11-N 28 D 11-J 11	50	6:12 (2:4)	N 27-J 15	50	4:8	N 27-J 15	50	6:12 (2:4)	O 15-N 13 N 22-D 11	50	4:8	O 9-N 27	50	4:8	O 2-O 25 N 20-D 15	50	4:8	Varying by zone	40	4:8	
1972-73	N 4-N 26 D 16-J 11	50	6:12 (2:4)	D 2-J 20	50	4:8	D 2-J 20	50	6:12 (2:4)	O 9-N 2 N 22-D 16	50	4:8	O 7-O 15 O 28-D 7	50	4:8	O 7-O 29 N 18-D 14	50	4:8	Varying by zone	45	4:8	
1973-74	N 10-N 24 D 22-J 20	45	Point System	D 8-D 10 D 15-J 20	40	4:8	D 12-J 20	40	5:10 (2:4)	O 1-O 13 N 7-D 8	45	4:8	O 6-O 21 N 3-D 1	45	4:8	O 6-O 27 N 17-D 9	45	4:8	Varying by zone	40	4:8	
1974-75	N 6-D 7 D 18-J 4	50	Point System	N 27-D 5 D 11-J 20	50	Point System	D 4-J 20	48	Point System	O 2-O 19 N 13-D 14	50	4:8	O 9-N 27	50	4:8	O 2-O 26 N 20-D 14	50	4:8	O 16-N 2 N 27-D 28	50	4:8	

Table A-2.--continued. Season dates, season lengths (days), and basic limits (daily bag:possession) for ducks, with mallard limits shown in parentheses when different, for the regular duck hunting season in each State (exclusive of local zoning and boundary exceptions), 1948-1974.

	Atlantic Flyway																							
	Connecticut			Rhode Island			New York: Mainland			New York: Long Island			Pennsylvania			West Virginia			New Jersey		
Hunting season	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits
1948-49	N 12-D 11	30	4:8	D 10-J 8	30	4:8	O 15-O 26 N 26-D 7	24	4:8	Not Zoned			O 15-N 13	30	4:8	D 10-J 8	30	4:8	N 12-D 11	30	4:8
1949-50	N 4-D 13	40	4:8	N 29-J 7	40	4:8	O 21-N 5 N 18-D 3	32	4:8				O 21-N 29	40	4:8	O 21-N 29	40	4:8	N 18-D 27	40	4:8
1950-51	N 3-D 12	40	4:8	N 17-D 26	40	4:8	O 20-N 4 D 8-D 23	32	4:8				O 13-N 21	40	4:8	O 20-N 28	40	4:8	N 17-D 26	40	4:8
1951-52	N 16-D 30	45	4:8	N 22-J 5	45	4:8	O 19-N 5 D 7-D 24	36	4:8				O 12-N 24	44	4:8	N 2-D 16	45	4:8	N 9-D 23	45	4:8
1952-53	N 7-D 31	55	4:8	N 12-J 5	55	4:8	O 25-D 18	55	4:8				O 20-D 13	55	4:8	N 3-D 27	55	4:8	N 7-D 31	55	4:8
1953-54	O 30-D 28	60	4:8	N 6-J 4	60	4:8	O 17-D 15	60	4:8	N 6-J 4	60	4:8	O 15-D 12	59	4:8	O 26-D 24	60	4:8	N 6-J 4	60	4:8
1954-55	N 3-J 1	60	4:8	N 12-J 10	60	4:8	O 16-D 14	60	4:8	N 3-J 1	60	4:8	O 15-D 13	60	4:8	N 10-J 8	60	4:8	N 3-J 1	60	4:8
1955-56	O 22-D 30	70	4:8	N 7-J 15	70	4:8	O 15-D 23	70	4:8	O 29-J 6	70	4:8	O 10-D 17	69	4:8	O 29-J 6	70	4:8	O 29-J 6	70	4:8
1956-57	N 3-J 11	70	4:8	N 7-J 15	70	4:8	O 15-D 23	70	4:8	N 3-J 11	70	4:8	O 10-D 18	70	4:8	N 5-J 13	70	4:8	N 3-J 11	70	4:8
1957-58	O 26-J 3	70	4:8	N 7-J 15	70	4:8	O 19-D 27	70	4:8	N 2-J 10	70	4:8	O 15-D 23	70	4:8	N 3-J 11	70	4:8	N 2-J 10	70	4:8
1958-59	O 25-N 8 N 29-J 6	54	4:8	N 17-J 15	60	4:8	O 16-N 25 D 27-J 8	54	4:8	N 10-J 8	60	4:8	O 15-D 13	60	4:8	N 12-J 10	60	4:8	N 10-J 8	60	4:8
1959-60	O 24-O 31 N 27-J 2	45	3:6	N 20-J 8	50	3:6	O 16-D 4	50	3:6	N 14-D 23	40	4:8	O 24-D 12	50	3:6	N 20-J 8	50	3:6	N 14-D 23	40	4:8
1960-61	O 22-N 5 D 9-J 7	45	3:6	N 20-J 8	50	3:6	O 14-D 2	50	3:6	N 19-J 7	50	3:6	O 22-D 10	50	3:6	O 25-N 5 D 6-J 7	45	3:6	N 19-J 7	50	3:6
1961-62	N 11-D 30	50	2:4	N 21-D 30	40	3:6	O 13-N 5 D 19-D 30	36	3:6	N 21-D 30	40	3:6	O 21-D 9	50	2:4	O 21-O 31 D 6-D 30	36	3:6	N 21-D 30	40	3:6
1962-63	O 20-N 3 N 30-D 29	45	2:4	N 11-D 30	50	2:4	O 12-N 15 D 21-D 30	45	2:4	O 20-N 3 N 30-D 29	45	2:4	O 20-D 8	50	2:4	O 22-N 1 N 26-D 29	45	2:4	N 3-D 22	50	2:4
1963-64	O 19-N 2 D 6-J 4	45	3:6 (2:4)	N 17-J 5	50	3:6 (2:4)	N 2-D 21	50	3:6 (2:4)	N 2-N 16 D 6-J 4	45	3:6 (2:4)	O 12-O 18 N 4-D 16	50	3:6 (2:4)	N 21-J 4	45	3:6 (2:4)	O 26-N 16 D 13-J 4	45	3:6 (2:4)
1964-65	O 17-O 31 D 4-J 2	45	3:6 (2:4)	N 15-J 3	50	3:6 (2:4)	O 17-D 5	50	3:6 (2:4)	O 17-O 31 D 4-J 2	45	3:6 (2:4)	O 10-N 28	50	3:6 (2:4)	O 17-O 24 N 27-J 2	45	3:6 (2:4)	O 24-N 14 D 11-J 2	45	3:6 (2:4)
1965-66	O 16-O 30 D 10-J 8	45	3:6 (2:4)	N 21-J 9	50	3:6 (2:4)	O 16-N 20 J 1-J 9	45	3:6 (2:4)	O 16-O 30 D 10-J 8	45	3:6 (2:4)	O 9-N 2 N 22-D 11	45	3:6 (2:4)	O 16-O 23 D 3-J 8	45	3:6 (2:4)	O 23-N 4 N 24-D 25	45	3:6 (2:4)
1966-67	O 15-O 29 N 19-D 23	50	3:6	N 15-J 8	55	3:6	O 15-D 8	55	3:6	O 15-O 29 N 19-D 23	50	3:6	O 8-O 15 N 4-D 15	50	3:6	O 15-O 22 N 28-J 7	49	3:6	O 22-O 29 N 22-J 2	50	3:6
1967-68	O 21-N 4 N 23-D 22	45	3:6	N 19-J 7	50	3:6	O 14-N 17 D 14-D 23	45	3:6	N 4-D 23	50	3:6	O 14-D 2	50	3:6	O 14-O 21 D 1-J 6	45	3:6	N 4-D 23	50	3:6
1968-69	O 19-N 2 D 13-J 11	45	3:6 (2:4)	N 27-J 15	50	3:6 (2:4)	O 12-N 30	50	3:6 (2:4)	N 18-J 6	50	3:6 (2:4)	O 12-N 30	50	3:6 (2:4)	O 12-O 19 D 10-J 15	45	3:6 (2:4)	O 19-O 26 N 22-D 28	45	3:6 (2:4)
1969-70	O 18-N 1 D 12-J 10	45	3:6	N 16-J 4	50	3:6	O 6-D 1	57	3:6	N 17-J 5	50	3:6	O 11-D 6	57	3:6	O 11-N 1 D 18-J 15	51	3:6	O 18-O 25 N 21-D 27	45	3:6
1970-71	O 17-N 7 D 7-J 2	49	4:8	N 20-J 8	50	4:8	O 5-N 18 D 19-J 2	60	3:6	N 16-J 4	50	4:8	O 10-D 8	60	3:6	O 10-O 31 D 19-J 15	50	4:8	O 17-O 24 N 19-J 9	60	Point System
1971-72	O 16-O 30 D 6-J 8	49	4:8	O 23-O 25 N 22-J 7	50	4:8	O 11-N 29 D 24-J 2	60	3:6	N 15-J 3	50	4:8	O 9-D 7	60	3:6	O 16-O 30 D 7-J 20	60	3:6	O 16-O 23 N 18-J 8	60	Point System
1972-73	O 21-N 4 D 9-J 12	50	4:8	O 21-O 23 N 20-J 15	60	3:6	O 2-N 20 D 22-D 31	60	3:6	N 20-J 8	50	5:10 (4:8)	O 7-O 14 O 26-D 16	60	3:6	O 14-N 1 D 11-J 20	60	3:6	O 14-O 21 N 16-J 6	60	Point System
1973-74	O 20-O 27 N 30-J 5	45	4:8	O 20-O 22 N 17-D 28	45	4:8	O 1-N 4 D 14-D 23	45	4:8	N 19-J 2	45	4:8	O 13-O 20 N 2-D 8	45	4:8	O 13-O 20 D 14-J 19	45	4:8	O 13-O 20 N 21-J 1	50	Point System
1974-75	Varying by zone		4:8	O 23-O 26 N 27-J 16	55	Point System	O 16-N 23 D 25-J 4	50	4:8	N 20-J 8	50	4:8	O 12-O 19 N 8-D 14	45	4:8	O 2-O 19 D 18-J 18	50	4:8	O 9-O 19 N 27-J 9	55	Point System

Table A-2.--continued. Season dates, season lengths (days), and basic limits (daily bag:possession) for ducks, with mallard limits shown in parentheses when different, for the regular duck hunting season in each State (exclusive of local zoning and boundary exceptions), 1948-1974.

	Atlantic Flyway																							
	Delaware			Maryland			Virginia			North Carolina			South Carolina			Georgia			Florida		
Hunting season	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits	Season dates	Total days	Basic limits
1948-49	O 29-N 9 D 10-D 21	24	4:8	N 12-N 23 D 28-J 8	24	4:8	D 10-J 8	30	4:8	D 10-J 8	30	4:8	D 10-J 8	30	4:8	D 10-J 8	30	4:8	D 10-J 8	30	4:8
1949-50	N 4-N 19 D 23-J 7	32	4:8	N 18-D 27	40	4:8	N 29-J 7	40	4:8	N 29-J 7	40	4:8	N 29-J 7	40	4:8	N 29-J 7	40	4:8	N 29-J 7	40	4:8
1950-51	N 3-N 18 D 15-D 30	32	4:8	N 27-J 5	40	4:8	N 27-J 5	40	4:8	N 27-J 5	40	4:8	N 27-J 5	40	4:8	N 27-J 5	40	4:8	N 27-J 5	40	4:8
1951-52	N 9-D 23	45	4:8	N 22-J 5	45	4:8	N 22-J 5	45	4:8	N 22-J 5	45	4:8	N 22-J 5	45	4:8	N 22-J 5	45	4:8	N 22-J 5	45	4:8
1952-53	O 31-D 24	55	4:8	N 17-J 10	55	4:8	N 17-J 10	55	4:8	N 17-J 10	55	4:8	N 17-J 10	55	4:8	N 17-J 10	55	4:8	N 17-J 10	55	4:8
1953-54	N 11-J 9	60	4:8	N 11-J 9	60	4:8	N 11-J 9	60	4:8	N 11-J 9	60	4:8	N 11-J 9	60	4:8	N 11-J 9	60	4:8	N 12-J 10	60	4:8
1954-55	N 1-N 27 D 15-J 10	54	4:8	N 12-J 10	60	4:8	N 12-J 10	60	4:8	N 10-J 8	60	4:8	N 12-J 10	60	4:8	D 9-J 19	42	4:8	N 12-J 10	60	4:8
1955-56	N 4-J 12	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	N 7-J 14	69	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8
1956-57	N 2-J 10	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8
1957-58	N 1-J 9	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	N 7-J 15	70	4:8	N 23-J 15	54	4:8
1958-59	N 7-J 5	60	4:8	N 17-J 15	60	4:8	N 14-J 12	60	4:8	N 17-J 15	60	4:8	N 17-J 15	60	4:8	N 17-J 15	60	4:8	N 22-J 15	55	4:8
1959-60	N 17-D 26	40	4:8	N 20-J 8	50	3:6	N 20-J 8	50	3:6	N 20-J 8	50	3:6	N 30-J 8	40	4:8	N 30-J 8	40	4:8	N 30-J 8	40	4:8
1960-61	N 9-D 28	50	3:6	N 19-J 7	50	3:6	N 19-J 7	50	3:6	N 19-J 7	50	3:6	N 29-J 7	40	4:8	N 29-J 7	40	4:8	D 2-J 8	38	4:8
1961-62	N 6-D 15	40	3:6	N 11-D 30	50	2:4	N 10-D 19	40	3:6	N 21-D 30	40	3:6	N 21-D 30	40	3:6	N 11-D 30	50	2:4	N 17-D 26	40	3:6
1962-63	N 12-D 29	48	2:4	N 9-D 28	50	2:4	N 10-D 29	50	2:4	N 10-D 29	50	2:4	N 20-D 29	40	3:6 (2:4)	N 21-D 30	40	3:6 (2:4)	N 21-D 30	40	3:6 (2:4)
1963-64	N 1-N 23 D 9-D 30	45	3:6 (2:4)	N 13-J 1	50	3:6 (2:4)	N 16-J 4	50	3:6 (2:4)	N 16-J 4	50	3:6 (2:4)	N 16-J 4	50	3:6 (2:4)	N 26-J 4	40	4:8 (2:4)	N 27-J 5	40	4:8 (2:4)
1964-65	N 7-D 26	50	3:6 (2:4)	N 14-J 2	50	3:6 (2:4)	N 14-J 2	50	3:6 (2:4)	N 14-J 2	50	3:6 (2:4)	N 24-J 2	40	4:8 (2:4)	N 24-J 2	40	4:8 (2:4)	N 25-J 3	40	4:8 (2:4)
1965-66	N 4-D 23	50	3:6 (2:4)	N 20-J 8	50	3:6 (2:4)	N 20-J 8	50	3:6 (2:4)	N 20-J 8	50	3:6 (2:4)	N 20-J 8	50	3:6 (2:4)	N 30-J 8	40	4:8 (2:4)	N 24-D 6 D 18-J 9	36	4:8 (2:4)
1966-67	N 4-N 26 D 12-J 7	50	3:6	N 14-J 7	55	3:6	N 14-J 7	55	3:6	N 14-J 7	55	3:6	N 24-J 7	45	4:8	N 24-J 7	45	4:8	N 24-N 27 D 3-J 8	41	4:8
1967-68	N 3-N 25 D 15-J 5	45	3:6	N 18-J 6	50	3:6	N 18-J 6	50	3:6	N 18-J 6	50	3:6	N 18-J 6	50	3:6	N 28-J 6	40	4:8	N 23-N 26 D 7-J 7	36	4:8
1968-69	N 8-D 27	50	3:6 (2:4)	N 27-J 15	50	3:6 (2:4)	N 27-J 15	50	3:6 (2:4)	N 27-J 15	50	3:6 (2:4)	N 27-J 15	50	3:6 (2:4)	D 7-J 15	40	4:8 (2:4)	N 28-D 1 D 14-J 14	36	4:8 (2:4)
1969-70	N 1-N 22 D 12-J 3	45	3:6	O 31-N 28 D 23-J 13	51	3:6	N 22-J 10	50	3:6	N 20-J 15	57	3:6	N 29-J 14	47	4:8	N 20-J 15	57	3:6	N 27-J 12	47	4:8
1970-71	O 31-N 28 D 12-J 1	50	4:8	N 11-N 27 D 1-J 2	50	4:8	N 14-J 2	50	4:8	N 18-J 16	60	3:6	D 2-J 20	50	4:8	D 2-J 20	50	4:8	N 26-J 20	56	Point System
1971-72	O 30-N 27 D 11-D 31	50	4:8	N 6-N 27 D 9-J 15	60	3:6	N 20-J 18	60	3:6	N 20-J 18	60	3:6	D 2-J 20	50	4:8	N 22-J 20	60	3:6	N 25-J 20	57	Point System
1972-73	N 4-N 25 D 16-J 12	50	5:10 (4:8)	N 6-N 24 D 9-J 8	50	5:10 (4:8)	N 22-J 20	60	3:6	N 23-N 25 D 5-J 20	50	5:10 (4:8)	N 22-D 2 D 13-J 20	50	5:10 (4:8)	D 2-J 20	50	5:10 (4:8)	N 23-J 20	59	Point System
1973-74	N 3-N 24 D 14-J 5	45	5:10	N 9-N 23 D 21-J 19	45	5:10	N 24-J 12	50	Point System	D 6-J 19	45	5:10	N 21-D 1 D 17-J 19	45	5:10	D 6-J 19	45	5:10	N 22-D 9 D 20-J 20	50	Point System
1974-75	N 6-N 30 D 11-J 4	50	5:10	N 6-N 29 D 18-J 16	54	Point System	N 27-J 20	55	Point System	O 9-O 12 N 27-J 16	55	Point System	N 20-N 30 D 11-J 18	50	5:10	N 27-D 5 D 11-J 20	50	5:10	N 27-J 20	55	Point System

Table A-3. Summary of special Columbia Basin season hunting regulations, 1961-1974.

Hunting season	Washington Season dates	Washington Total days	Washington Basic duck (D) and mallard (M) limits	Oregon Season dates	Oregon Total days	Oregon Basic duck (D) and mallard (M) limits	Idaho Season dates	Idaho Total days	Idaho Basic duck (D) and mallard (M) limits
1961-62	O 14-D 27	75	Basic=4:8 D Bonus=2:4 M	O 21-J 3	75	Basic=4:8 D Bonus=2:4 M	O 14-D 27	75	Basic=5:5 D Bonus=2:4 M
1962-63	O 13-D 26	75	Basic=4:8 D Bonus=2:4 M	O 20-J 2	75	Basic=4:8 D Bonus=2:4 M	O 17-D 30	75	Basic=5:5 D Bonus=2:4 M
1963-64	O 12-J 5	86	Basic=4:8 D Bonus=2:4 M	O 8-J 5	90	Basic=4:8 D Bonus=2:4 M	O 8-J 5	90	Basic=5:5 D Bonus=2:4 M
1964-65	O 10-J 24	107	Basic=4:8 D Bonus=4:8 M	O 10-J 24	107	Basic=4:8 D Bonus=4:8 M	O 10-J 24	107	Basic=4:8 D Bonus=4:8 M
1965-66	O 16-J 23	100	Basic=3:6 D Bonus=3:6 M	O 9-J 16	100	Basic=3:6 D Bonus=3:6 M	O 9-J 16	100	Basic=3:6 D Bonus=3:6 M
1966-67	O 15-J 22	100	Basic=6:12 D	O 8-J 15	100	Basic=6:12 D	O 8-J 15	100	Basic=6:12 D
1967-68	O 14-J 21	100	Basic=6:12 D	O 10-J 17	100	Basic=6:12 D	O 7-J 14	100	Basic=6:12 D
1968-69	O 12-J 19	100	Basic=6:12 D Restriction=4:8 M	O 19-J 19	93	Basic=6:12 D Restriction=4:8 M	O 12-J 19	100	Basic=6:12 D Restriction=4:8 M
1969-70	O 11-J 18	100	Basic=6:12 D	O 18-J 18	93	Basic=6:12 D	O 11-J 18	100	Basic=6:12 D
1970-71	O 10-J 24	107	Basic=7:14 D	O 10-J 24	107	Basic=7:14 D	O 10-J 24	107	Basic=7:14 D
1971-72	O 16-J 23	100	Basic=7:14 D	O 9-J 23	107	Basic=7:14 D	O 9-J 23	107	Basic=7:14 D
1972-73	O 14-J 20	99	Basic=7:14 D	O 14-J 20	99	Basic=7:14 D	O 7-J 20	106	Basic=7:14 D
1973-74	O 13-J 20	100	Basic=6:12 D	O 13-J 20	100	Basic=6:12 D	O 6-J 13	100	Basic=6:12 D
1974-75	O 12-J 19	100	Basic=6:12 D	O 12-J 19	100	Basic=6:12 D	O 5-J 12	100	Basic=6:12 D

Shooting hours

1964-65 through 1967-78: 1/2 hour before sunrise to 1/2 hour after sunset.
1968-69 and 1969-70: 1/2 hour before sunrise to sunset.
1970-71 through 1973-74: 1/2 hour before sunrise to 1/2 hour after sunset.
1974-75: 1/2 hour before sunrise to sunset.

Area included

Washington	Oregon	Idaho
1961-62 and 1962-63: Adams, Asotin, Benton, Columbia, Douglas, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Spokane, Walla Walla, Whitman, and Yakima Counties. 1963-64 through 1974-75: All of State east of summit of Cascade Mountains.	Entire Period: Baker, Gilliam, Malheur, Morrow, Sherman, Umatilla, Union, Wallowa, and Wasco Counties.	1961-62: Ada, Blaine, Camas, Canyon, Cassia, Elmore, Gem, Gooding, Jerome, Lincoln, Minidoka, Owyhee, Payette, Twin Falls, and Washington Counties. 1962-63: Benewah, Kootenai, Latah, Lewis, and Nez Perce Counties added. 1963-64 through 1966-67: Bonner and Boundary Counties added. 1967-68 through 1969-70: Shoshone County added. 1970-71 through 1974-75: Bannock, Bingham, and Power Counties added.

General information

1961-62 through 1963-64: Statewide regulations applied with bonus of 2:4 mallards in area indicated.
1964-65 through 1974-75: Special season afforded longer shooting hours and/or longer season, in addition to a larger bag limit with fewer species restrictions, than Statewide regulations.

Table A-4. Summary of experimental San Luis Valley October season hunting regulations, 1963-1970.

	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71
Season dates:	0 1-0 18	0 1-0 18	0 1-0 18	0 1-0 18	0 1-0 18	0 1-0 18	0 1-0 18	0 1-0 18
Opening day on:	Tuesday	Thursday	Friday	Saturday	Sunday	Tuesday	Wednesday	Thursday
Shooting hours:	Sunrise to sunset	Sunrise to sunset	Sunrise to sunset	1/2 hour before sunrise to noon, MST	1/2 hour before sunrise to noon, MST	Sunrise to sunset	Sunrise to sunset	Sunrise to sunset
Permit required?	No	No	No	Yes	Yes	Yes	Yes	Yes
Open season on:	Ducks only	Ducks only	Ducks & coots	Ducks & coots	Ducks & coots	Ducks & coots	Ducks & coots	Ducks & coots
Basic daily bag and possession limits	5:10	5:10	5:10	5:10	6:12	70 points plus fraction of value of last bird taken; 2 legal daily bag limits[a]		100 points plus fraction of value of last bird: 2 legal daily bag limits[a]
and related regulations	Closed on redhead and canvasback	Including no more than 2:2 redheads and canvasbacks in any combination	Including no more than 2:2 canvasbacks	Including no more than 2:4 Canvasbacks	Provided that at least 4:8 are mallard drakes	Points for each: ♂ mallard=10 ♀ mallard=40 other duck and coot =30	Points for each: ♂ mallard, ♂ pintail, northern shoveler[b], teal, and coot =10 ♀ mallard, redhead, and canvasback=60 other duck=35	Points for each: ♀ mallard, wood duck, redhead, canvasback, Mexican duck, and hooded merganser =90 ♂ mallard, ♀ pintail, mottled duck, and ringneck duck =20 other duck and coot =10
Counties included:	Alamosa, Conejos, Costilla, Rio Grande, and the Central Flyway portion of Saguache during entire period; Central Flyway portions of Hinsdale and Mineral added in 1964							

[a] The daily bag limit could contain from 2 to 7 birds in 1968 and 1969, and from 2 to 10 birds in 1970, depending on its composition. The point totals for one day could legally go as high as 100 in 1968, 125 in 1969, and 180 in 1970 if a high point bird was the last bird taken in reaching this total.

[b] *Anas clypeata*

Table A-5. Summary of experimental High Plains season hunting regulations, 1968 and 1969.

	1968-69		1969-70
Area included:	Central Flyway portions of Colorado and Montana.	Central Flyway portion of Wyoming.	Central Flyway portions of Colorado, Montana, New Mexico, and Wyoming; that part of Nebraska west of U.S. highway 83; and, in South Dakota, all of Butte, Custer, Lawrence, and Fall River Counties plus that part of Pennington and Meade Counties south of the Belle Fourche and west of the Cheyenne Rivers.
Season dates:	D 14-J 5	D 21-J 12	D 13-J 4
Season length:	23 days	23 days	23 days
Shooting hours:	Sunrise to sunset	Sunrise to sunset	Sunrise to sunset
Permit required?	Yes	Yes	Yes
Basic daily bag and possession limits and related regulations	4:8 mallard drakes	4:8 mallard drakes	40 points plus fraction of last bird taken:2 legal daily bag limits. Each mallard drake = 10 points and each other duck, merganser, and coot = 40 points.

Table A-6. Number of Migratory Bird Hunting Stamps sold by hunting season, State, and flyway during the first 41 years of issuance.

	Hunting season	Alaska	Pacific Flyway: Washington	Oregon	Idaho	Montana	Wyoming	California	Nevada	Utah	Colorado	Arizona	New Mexico	Flyway total
$1 stamp	1934-35	2,000	29,033	13,199	9,840	-	-	39,525	2,513	7,133	-	2,332	-	103,575
	1935-36	2,380	18,980	9,709	6,610	-	-	33,297	2,272	3,672	-	1,760	-	76,300
	1936-37	1,708	28,396	13,772	10,526	-	-	44,570	3,398	8,123	-	1,736	-	110,521
	1937-38	2,094	40,606	19,540	10,138	-	-	52,577	3,921	9,185	-	2,363	-	138,330
	1938-39	2,227	46,151	22,435	15,608	-	-	63,394	4,899	12,685	-	2,919	-	168,091
	1939-40	2,761	50,796	26,774	19,064	-	-	74,644	5,608	14,520	-	3,555	-	194,961
	1940-41	2,520	62,720	32,239	20,516	-	-	86,953	6,403	16,886	-	3,951	-	229,668
	1941-42	3,911	70,185	39,484	23,104	-	-	111,389	6,656	18,886	-	4,348	-	274,052
	1942-43	3,308	59,683	32,806	25,265	-	-	91,619	5,881	18,046	-	3,535	-	236,835
	1943-44	4,143	63,050	32,750	19,921	-	-	92,056	5,288	15,679	-	4,145	-	232,889
	1944-45	4,430	77,740	42,203	25,484	-	-	117,507	6,239	20,868	-	5,535	-	295,576
	1945-46	4,186	76,007	47,511	34,590	-	-	131,009	7,808	24,883	-	6,203	-	328,011
	1946-47	3,758	81,596	56,411	39,098	-	-	154,652	9,402	29,537	-	7,525	-	378,221
	1947-48	4,113	74,937	60,390	39,470	-	-	137,279	8,586	25,522	-	7,427	-	353,611
	1948-49	4,881	74,555	65,947	47,575	-	-	171,388	10,574	34,558	-	8,562	-	413,159
$2 stamp	1949-50	3,349	81,404	59,853	40,159	-	-	168,950	9,553	34,527	-	7,443	-	401,889
	1950-51	5,703	82,378	64,239	38,405	-	-	150,661	9,405	32,233	-	7,083	-	384,404
	1951-52	7,909	84,000	68,524	40,124	-	-	173,136	10,532	33,177	-	8,645	-	418,138
	1952-53	8,302	83,813	73,327	38,927	-	-	214,456	11,867	34,972	-	11,982	-	469,344
	1953-54	10,009	86,031	73,268	39,224	-	-	193,126	11,888	36,298	-	9,938	-	449,773
	1954-55	10,766	80,680	70,741	37,425	-	-	176,881	9,669	32,289	-	9,125	-	416,810
	1955-56	9,797	80,830	69,876	35,614	-	-	180,173	11,081	32,976	-	10,247	-	420,797
	1956-57	9,428	85,997	65,264	34,945	-	-	180,300	11,288	32,011	-	9,251	-	419,056
	1957-58	9,796	80,394	68,285	32,776	-	-	183,011	11,233	32,145	-	10,145	-	417,989
	1958-59	9,135	80,192	59,413	33,569	-	-	160,949	11,175	32,534	-	9,256	-	387,088
$3 stamp	1959-60	9,081	66,122	51,228	27,150	-	-	114,240	9,284	24,979	-	7,077	-	300,080
	1960-61	10,895	66,416	49,536	25,633	-	-	135,809	7,736	23,709	-	7,039	-	315,878
	1961-62	10,517	63,374	42,446	25,295	7,960[a]	-	123,302	5,427	19,086	-	7,288	-	294,178
	1962-63	10,371	62,091	39,102	22,389	7,085	1,330[a]	125,199	7,983	21,907	2,298[a]	6,040	496[a]	295,920
	1963-64	10,456	66,335	43,981	23,669	8,151	1,348	136,833	8,749	25,114	2,860	7,418	669	325,127
	1964-65	9,244	64,262	43,741	25,266	7,813	1,435	135,419	9,639	25,621	2,822	8,432	669	325,119
	1965-66	9,406	65,534	44,558	24,217	18,307[a]	1,354	141,664	10,673	25,488	2,606	7,859	796	343,056
	1966-67	10,640	69,235	48,884	27,400	21,156	1,430	153,308	11,928	32,877	3,605	8,773	955	379,551
	1967-68	10,358	70,974	48,332	28,595	19,715	1,467	153,053	12,713	32,128	3,238	10,281	868	381,364
	1968-69	12,411	72,290	48,261	29,350	19,349	1,576	162,622	12,491	33,864	3,362	10,196	847	394,208
	1969-70	13,281	80,565	55,122	30,929	19,912	1,554	175,628	13,220	33,928	3,584	12,745	833	428,020
	1970-71	12,936	84,112	61,343	31,768	20,600	1,635	188,861	14,361	35,946	3,913	14,199	807	457,545
	1971-72	14,423	77,067	58,730	33,640	19,896	1,781	173,474	15,029	37,588	4,514	15,465	962	438,146
$5 stamp	1972-73	14,921	69,745	52,204	31,381	19,675	1,744	152,414	12,701	33,044	3,813	11,954	928	389,603
	1973-74	17,068	72,502	50,986	32,810	19,013	1,715	144,582	13,732	35,665	4,167	11,059	925	387,156
	1974-75	16,018	70,353	51,290	34,377	19,892	2,053	149,548	11,714	38,575	4,562	13,474	1,022	396,860

	Hunting season	Central Flyway: Montana	North Dakota	South Dakota	Wyoming	Nebraska	Colorado	Kansas	New Mexico	Oklahoma	Texas	Flyway total	Mississippi Flyway: Minnesota	Wisconsin
$1 stamp	1934-35	14,120	5,947	12,594	3,073	21,336	10,482	17,334	2,671	27,862	42,424	157,843	51,536	40,769
	1935-36	10,474	6,581	9,461	2,660	17,818	6,695	17,353	1,681	8,824	28,150	109,697	44,062	35,154
	1936-37	14,903	6,069	8,025	4,010	20,280	11,917	16,118	2,164	5,967	33,481	122,934	72,460	48,999
	1937-38	15,884	9,513	17,639	4,607	22,939	10,517	18,868	2,173	21,005	45,357	168,502	97,609	61,783
	1938-39	19,978	13,167	22,334	5,731	30,847	18,666	20,495	3,524	19,675	58,704	213,121	116,461	79,688
	1939-40	24,836	15,148	21,849	6,896	26,588	22,663	18,536	4,187	19,740	63,460	223,903	120,034	84,075
	1940-41	28,645	17,584	25,446	7,510	26,745	24,453	26,915	5,077	25,199	77,300	264,874	118,931	89,317
	1941-42	30,778	28,087	28,977	8,510	30,134	27,384	37,276	4,732	28,769	83,593	308,240	121,032	89,195
	1942-43	26,515	27,330	38,926	7,522	28,501	23,803	36,226	4,255	29,443	79,577	302,098	110,986	83,527
	1943-44	22,147	20,713	25,483	6,447	21,181	19,969	25,278	4,614	19,974	70,441	236,247	95,446	66,328
	1944-45	26,298	30,551	46,203	8,446	34,843	24,884	39,750	6,654	32,442	99,638	349,709	115,415	75,208
	1945-46	30,605	37,108	66,012	9,599	37,535	30,837	42,016	7,018	37,851	115,008	413,589	130,757	83,681
	1946-47	31,153	45,575	82,367	10,428	51,740	37,249	55,282	8,440	48,823	125,825	496,882	175,151	102,971
	1947-48	31,460	47,750	53,513	8,658	49,604	28,217	39,754	6,357	33,935	121,156	420,404	145,926	91,326
	1948-49	36,040	53,936	62,509	11,461	64,991	41,407	53,094	9,010	55,625	164,075	552,148	162,300	101,842
$2 stamp	1949-50	31,725	50,533	47,208	9,022	64,993	31,584	61,563	8,803	49,417	130,732	485,580	143,496	103,826
	1950-51	31,175	48,586	48,200	10,046	65,809	30,336	63,410	8,293	43,390	131,674	480,919	145,708	103,981
	1951-52	34,686	47,957	59,125	12,125	75,562	33,495	77,171	8,577	50,843	157,510	557,051	162,486	108,429
	1952-53	34,676	45,925	55,270	12,897	60,194	40,192	50,789	11,405	42,706	151,120	505,174	163,109	134,351
	1953-54	31,608	43,409	49,679	11,437	52,472	39,048	49,133	10,497	52,611	172,016	511,910	154,004	131,029
	1954-55	33,201	44,554	49,281	10,314	59,455	32,450	48,815	10,066	38,387	151,851	478,374	143,886	127,358
	1955-56	35,107	44,861	40,375	10,885	58,335	39,107	62,694	10,464	52,573	169,229	523,630	131,985	131,101
	1956-57	33,970	44,300	43,368	10,445	56,502	36,289	46,845	8,886	44,399	166,268	491,272	150,550	130,306
	1957-58	36,841	47,070	49,832	11,312	67,218	42,541	73,086	10,207	50,033	167,385	555,525	151,156	115,248
	1958-59	34,264	39,282	42,514	10,650	64,081	41,915	70,424	8,854	42,801	146,667	501,452	147,932	109,869
$3 stamp	1959-60	24,709	26,394	30,831	7,655	49,813	31,487	53,693	5,681	31,562	105,450	367,275	118,588	100,645
	1960-61	24,226	37,522	41,979	7,302	46,106	30,981	50,806	5,822	32,506	106,144	383,394	139,065	109,875
	1961-62	13,768[a]	25,597	30,549	5,147	33,409	25,625	40,275	3,789	24,844	68,862	271,865	85,251	89,848
	1962-63	7,476	25,550	28,127	2,332[a]	19,027	13,325[a]	21,988	1,461[a]	14,829	51,518	185,633	78,071	73,141
	1963-64	11,920	36,502	36,359	3,491	26,531	20,232	28,797	4,838	19,877	73,923	262,470	111,844	94,213
	1964-65	13,079	39,120	34,668	4,309	28,732	23,453	27,801	4,419	21,787	83,442	280,810	128,764	104,522
	1965-66	4,813[a]	33,983	31,071	1,802	24,382	18,723	32,384	3,674	20,870	88,325	260,027	125,752	105,767
	1966-67	6,100	39,070	35,695	4,178	32,284	27,037	35,264	4,704	25,723	101,161	311,216	151,415	108,833
	1967-68	6,449	40,114	41,798	4,879	40,540	28,931	47,935	5,226	32,806	111,479	360,157	157,937	110,479
	1968-69	6,462	39,993	38,280	4,979	34,090	28,718	44,601	5,552	25,179	96,031	323,885	140,934	105,114
	1969-70	7,394	42,395	40,043	5,499	42,116	31,312	53,721	4,844	30,528	115,899	373,751	144,562	122,291
	1970-71	7,744	50,015	41,220	6,502	48,774	37,316	60,633	5,800	34,184	144,932	437,120	173,877	151,524
	1971-72	8,345	53,600	46,670	7,705	50,898	43,203	63,756	6,362	36,049	138,047	454,635	179,624	160,435
$5 stamp	1972-73	8,054	50,946	45,757	6,553	48,684	37,332	61,472	5,600	31,177	129,462	425,037	155,933	138,050
	1973-74	8,216	49,193	45,471	6,537	50,839	39,046	58,805	5,311	31,456	117,446	412,320	125,654	121,524
	1974-75	7,930	54,917	41,476	6,803	48,195	39,062	64,440	6,474	34,019	122,819	426,135	146,074	134,389

[a] Flyway boundary changed this year.

Table A-6.--continued. Number of Migratory Bird Hunting Stamps sold by hunting season, State, and flyway during the first 41 years of issuance.

	Hunting season	Mississippi Flyway												Flyway total
		Michigan	Iowa	Illinois	Indiana	Ohio	Missouri	Kentucky	Arkansas	Tennessee	Louisiana	Mississippi	Alabama	
$1 stamp	1934-35	25,348	16,129	42,687	8,250	10,407	23,001	2,314	11,973	6,918	20,081	4,703	2,533	266,649
	1935-36	14,796	18,910	36,337	5,379	7,001	14,080	1,291	9,134	5,024	10,242	3,154	1,403	205,967
	1936-37	31,482	27,294	53,251	7,648	10,493	17,149	1,136	10,268	4,754	13,721	3,168	1,914	303,737
	1937-38	56,888	25,427	51,333	12,311	14,662	16,469	2,676	11,799	5,366	19,366	4,855	2,889	383,433
	1938-39	80,458	36,267	57,538	14,724	19,076	20,034	3,465	15,342	7,813	31,190	6,306	4,940	493,302
	1939-40	86,064	39,143	66,434	18,686	20,680	26,961	4,564	14,401	8,615	33,870	7,591	5,833	536,951
	1940-41	94,180	40,670	64,212	18,882	23,558	26,723	4,611	16,330	10,600	43,079	9,211	6,590	566,894
	1941-42	103,798	51,268	84,997	22,071	25,855	36,828	4,553	18,526	12,326	45,102	9,707	6,969	632,227
	1942-43	108,663	41,739	83,391	24,157	27,631	40,834	5,065	24,266	12,160	44,252	8,902	6,924	622,497
	1943-44	83,554	36,749	66,587	22,740	21,334	34,193	4,227	19,725	10,929	35,199	7,487	5,841	510,339
	1944-45	90,265	44,339	69,891	24,462	22,987	41,354	5,772	26,451	13,941	45,455	10,313	7,226	593,079
	1945-46	100,382	43,529	77,452	28,159	27,777	44,962	8,390	45,538	20,393	56,876	15,211	9,466	692,573
	1946-47	117,294	54,925	93,387	35,409	37,105	52,563	6,178	48,874	20,224	53,490	16,861	10,319	824,751
	1947-48	91,334	52,719	81,753	17,038	27,087	50,733	5,502	44,788	19,830	62,998	17,322	11,210	719,566
	1948-49	83,582	63,805	110,980	35,574	39,176	69,269	7,717	60,758	25,746	80,701	20,507	12,595	874,552
$2 stamp	1949-50	98,285	56,477	106,767	31,183	33,249	62,901	7,977	54,214	25,577	71,923	17,825	10,993	824,693
	1950-51	88,425	49,518	94,062	29,386	33,435	51,811	8,102	55,706	25,752	71,834	18,537	10,290	786,547
	1951-52	111,651	62,169	114,836	36,983	37,561	69,342	13,328	64,892	31,137	74,339	19,250	12,836	919,239
	1952-53	136,306	54,396	119,873	43,137	42,625	61,668	17,366	61,091	35,060	83,072	19,043	17,962	989,059
	1953-54	137,225	70,510	114,914	41,751	43,081	50,626	14,936	25,466	33,200	92,478	18,938	17,699	945,857
	1954-55	129,937	56,991	110,507	39,716	38,730	58,606	14,969	46,219	33,783	88,237	17,264	15,879	922,082
	1955-56	146,240	52,196	125,185	48,756	47,076	75,772	17,887	58,122	39,210	106,316	20,646	18,653	1,019,145
	1956-57	140,648	57,505	117,650	47,659	46,738	72,873	18,622	55,136	41,431	102,734	20,598	20,245	1,022,695
	1957-58	128,131	58,994	119,010	50,565	45,107	76,774	19,450	59,064	42,203	102,224	19,379	17,173	1,004,478
	1958-59	110,076	55,393	108,884	43,241	44,297	73,153	17,382	59,558	38,677	91,757	19,427	16,292	935,938
$3 stamp	1959-60	77,538	50,447	85,790	29,687	26,813	53,849	9,425	38,626	21,129	66,688	13,821	10,698	703,744
	1960-61	84,284	49,657	78,722	29,935	39,057	49,103	9,500	43,642	25,375	63,741	13,808	10,876	746,640
	1961-62	64,628	41,147	63,435	20,862	24,853	39,118	6,337	19,037	15,020	44,732	7,128	5,749	527,145
	1962-63	49,610	30,602	42,256	15,965	20,057	27,016	4,488	9,549	8,066	39,766	7,102	6,292	411,981
	1963-64	70,094	37,166	53,125	16,831	23,818	34,021	5,725	18,352	15,261	66,556	13,292	11,369	571,667
	1964-65	79,268	37,668	53,229	16,945	25,192	38,392	7,146	34,838	21,598	86,162	16,221	13,846	663,791
	1965-66	75,348	39,941	56,425	17,188	26,065	36,905	7,040	21,969	16,731	81,322	13,326	12,691	636,470
	1966-67	84,967	47,438	66,180	19,880	31,176	41,033	8,445	35,625	23,909	105,398	18,604	15,865	758,768
	1967-68	95,187	52,269	75,430	22,579	30,175	51,879	9,201	38,517	25,027	108,682	20,065	16,370	813,797
	1968-69	88,742	45,753	59,403	22,048	28,911	42,268	7,545	27,879	21,880	90,278	17,053	13,937	711,745
	1969-70	101,562	54,807	69,706	25,036	35,841	50,487	7,851	34,211	23,104	105,274	21,358	14,498	810,588
	1970-71	131,404	65,822	83,982	29,352	43,508	58,452	10,608	56,108	28,123	129,046	26,526	16,933	1,005,265
	1971-72	111,785	68,401	82,706	32,769	45,564	59,435	11,390	55,656	33,677	120,165	28,702	12,909	1,003,218
$5 stamp	1972-73	100,870	57,914	81,075	24,345	38,492	59,206	10,444	50,862	27,371	125,532[b/]	23,324	14,988	908,406
	1973-74	103,886	57,196	77,699	25,398	36,994	53,209	10,576	46,924	32,119	99,511	23,462	12,759	826,911
	1974-75	104,805	60,446	80,002	26,280	40,064	58,377	12,112	53,882	34,844	103,168	25,037	12,537	892,017

	Hunting season	Atlantic Flyway										
		Maine	Vermont	New Hampshire	Massachusetts	Connecticut	Rhode Island	New York	Pennsylvania	West Virginia	New Jersey	Delaware
$1 stamp	1934-35	6,539	1,754	1,641	14,124	4,372	1,794	21,502	8,751	566	12,739	3,600
	1935-36	3,214	1,116	829	6,033	2,116	1,074	11,917	5,088	396	6,040	1,259
	1936-37	4,527	1,256	1,166	7,380	2,381	1,177	15,470	5,458	419	6,517	1,115
	1937-38	5,546	1,810	1,688	12,161	3,249	1,477	23,286	5,613	446	9,921	2,001
	1938-39	7,812	2,263	1,864	12,087	4,318	1,824	29,825	13,353	789	14,486	2,576
	1939-40	8,349	2,851	2,727	15,048	4,904	2,641	32,304	16,008	1,037	16,936	3,164
	1940-41	10,017	3,153	3,226	19,464	6,733	3,239	42,934	22,044	1,521	20,525	3,646
	1941-42	10,350	3,395	3,545	22,230	8,434	3,997	50,822	30,317	1,769	23,388	3,752
	1942-43	10,770	3,642	4,074	20,135	8,501	3,353	46,344	34,604	1,528	24,991	3,232
	1943-44	9,162	2,836	3,432	18,677	6,172	2,764	38,730	25,027	1,481	19,519	2,906
	1944-45	12,407	3,965	4,231	21,616	9,506	3,535	46,475	34,322	1,873	24,609	3,916
	1945-46	14,731	4,303	4,708	25,165	10,683	4,220	56,354	41,185	2,014	29,356	4,648
	1946-47	15,016	4,593	5,750	28,142	11,224	4,864	62,680	48,308	2,092	39,454	5,130
	1947-48	10,905	3,161	3,428	15,780	6,692	2,595	48,029	32,841	2,243	16,948	3,284
	1948-49	12,142	3,865	3,656	19,370	7,699	2,564	66,809	47,389	1,859	17,649	4,823
$2 stamp	1949-50	10,187	3,360	3,014	17,408	5,534	2,092	50,727	31,920	2,662	15,847	4,709
	1950-51	10,024	3,467	3,224	17,253	6,012	2,387	52,222	38,496	2,167	17,780	4,564
	1951-52	10,606	3,453	3,349	18,803	5,972	2,338	55,627	40,636	3,788	20,499	5,122
	1952-53	12,703	4,017	4,445	16,645	7,327	2,927	59,455	43,931	2,612	28,364	6,351
	1953-54	13,262	4,341	5,107	19,506	7,776	3,098	73,112	46,006	2,335	25,937	6,737
	1954-55	12,266	4,208	4,667	18,952	8,095	3,185	74,741	48,646	2,480	26,341	7,018
	1955-56	13,586	4,713	5,104	20,770	9,214	3,260	85,814	53,064	2,454	29,558	7,905
	1956-57	12,861	4,684	5,088	22,197	8,725	3,350	73,697	51,860	2,942	26,600	7,905
	1957-58	12,700	4,468	4,910	20,543	8,818	3,059	68,559	47,707	2,690	29,777	8,081
	1958-59	12,139	4,243	4,740	21,180	9,112	2,929	66,580	40,722	2,278	22,416	8,022
$3 stamp	1959-60	9,599	3,313	3,706	17,020	6,955	2,358	55,888	27,407	1,679	16,841	6,668
	1960-61	10,730	3,803	4,433	17,736	8,485	2,130	60,426	30,747	1,688	17,890	6,229
	1961-62	7,213	3,616	4,220	17,411	6,204	2,057	53,731	25,684	1,218	15,226	6,336
	1962-63	8,020	3,637	4,333	17,162	7,497	1,625	50,014	27,621	1,454	18,734	5,664
	1963-64	10,080	3,564	3,598	16,607	7,838	2,326	44,726	34,259	1,491	23,165	7,347
	1964-65	10,997	4,292	4,721	18,255	7,834	2,196	53,917	37,855	1,263	22,312	7,815
	1965-66	11,969	4,789	5,809	20,202	8,341	2,203	57,363	41,598	1,607	26,350	8,380
	1966-67	13,641	5,115	6,563	22,452	9,548	2,500	67,549	43,662	1,641	26,928	9,179
	1967-68	13,223	5,725	6,726	21,119	9,479	2,507	77,586	52,084	1,876	28,935	9,695
	1968-69	14,696	5,884	7,656	23,758	12,005	2,961	86,492	58,055	1,799	30,384	11,055
	1969-70	15,939	6,317	8,938	25,630	12,889	3,313	98,403	67,224	1,898	32,974	11,657
	1970-71	18,182	7,435	9,880	29,993	15,779	3,509	108,582	81,074	2,103	35,002	12,503
	1971-72	18,534	8,758	9,973	26,106	14,069	4,354	116,709	87,661	1,858	43,673	12,9[illegible]
$5 stamp	1972-73	15,758	7,988	9,101	26,093	13,177	3,619	103,570	70,684	2,072	36,018	11,552
	1973-74	16,923	8,720	9,608	25,407	13,673	3,598	104,871	63,842	1,871	35,225	13,066
	1974-75	18,200	8,762	10,878	26,001	14,943	3,688	95,716	69,111	1,910	36,090	13,778

b/ As reported by the Postal Service. An error is suspected in the assignment of this total entirely to Louisiana, and a figure of 109,988 stamps is believed to be more accurate for purposes of making 1972-73 waterfowl harvest survey estimates for this State.

Table A-6.--continued. Number of Migratory Bird Hunting Stamps sold by hunting season, State, and flyway during the first 41 years of issuance.

	Hunting season	Atlantic Flyway							Other areas			Grand total
		Maryland	Washington D.C.	Virginia	North Carolina	South Carolina	Georgia	Florida	Flyway total	Hawaii	Puerto Rico	Philatelic Sales Unit	
$1 stamp	1934-35	6,575	1,204	4,628	4,964	1,800	1,540	6,704	104,797	137	-	- [c]	635,001
	1935-36	2,831	958	1,792	1,995	1,944	730	4,431	53,763	97	-	-	448,204
	1936-37	3,358	1,017	2,251	2,865	1,680	816	5,774	64,627	96	-	-	603,623
	1937-38	4,360	1,105	3,052	4,344	2,353	938	7,175	90,525	155	-	-	783,039
	1938-39	6,861	1,378	4,538	6,362	3,653	1,387	10,424	125,800	174	-	-	1,002,715
	1939-40	8,993	3,421	6,767	8,564	3,634	2,569	13,009	152,926	59	-	-	1,111,561
	1940-41	11,011	1,312	10,076	9,965	5,554	3,992	14,717	193,129	76	-	3,649	1,260,810
	1941-42	11,184	1,348	10,965	11,086	4,180	3,737	14,268	218,767	23	142	2,605	1,439,967
	1942-43	12,356	1,212	11,469	7,828	5,503	2,874	12,886	215,302	52	130	3,407	1,383,629
	1943-44	10,182	1,349	10,713	8,291	4,893	2,511	11,675	180,320	103	150	5,161	1,169,352
	1944-45	14,039	1,694	13,169	12,002	6,237	3,928	18,828	236,352	96	223	7,564	1,487,029
	1945-46	16,738	1,757	15,641	11,666	6,996	3,866	21,788	275,819	151	287	10,889	1,725,505
	1946-47	14,182	1,499	13,179	13,002	7,153	4,396	21,250	301,914	64	342	10,909	2,016,841
	1947-48	12,195	1,153	11,418	12,741	6,959	4,143	19,369	213,884	104	252	10,743	1,722,677
	1948-49	15,418	1,361	13,293	15,749	9,797	5,018	22,916	271,377	43	186	11,257	2,127,603
$2 stamp	1949-50	17,031	1,492	13,643	17,359	9,628	4,289	20,412	231,314	30	164	7,715	1,954,734
	1950-51	17,309	1,333	13,314	17,567	8,974	3,987	19,652	239,732	27	170	6,142	1,903,644
	1951-52	19,986	1,650	15,370	18,041	8,943	5,126	20,007	259,316	15	192	5,907	2,167,767
	1952-53	23,082	1,923	20,549	28,063	14,295	8,320	26,517	311,526	16	220	12,987	2,296,628
	1953-54	25,184	2,079	24,269	28,941	14,139	8,599	30,378	340,806	8	243	9,840	2,268,446
	1954-55	25,256	2,060	23,210	27,547	13,794	8,515	32,496	343,477	14	203	12,824	2,184,550
	1955-56	26,732	2,358	26,279	30,963	16,498	9,841	38,753	386,866	3	169	9,533	2,369,940
	1956-57	28,326	2,483	26,633	30,318	17,613	12,405	40,862	378,549	3	204	10,807	2,332,014
	1957-58	27,264	2,197	25,576	29,502	15,018	11,516	34,117	356,502	14	212	10,674	2,355,190
	1958-59	22,627	2,247	20,623	25,400	14,511	10,054	35,937	325,760	6	313	16,733	2,176,425
$3 stamp	1959-60	18,397	1,518	12,586	19,339	8,484	4,861	23,253	239,872	11	219	5,833	1,626,115
	1960-61	17,707	1,378	15,104	21,972	10,647	6,368	23,664	261,137	11	272	7,407	1,725,634
	1961-62	17,077	1,322	12,365	17,888	10,657	6,651	23,702	232,578	15	378	7,560	1,344,236
	1962-63	18,063	1,434	13,580	20,394	10,541	5,882	20,656	236,311	9	381	6,606	1,147,212
	1963-64	21,705	1,831	17,612	23,972	13,429	10,612	26,220	270,382	8	538	7,543	1,448,191
	1964-65	24,144	2,267	16,609	23,479	13,039	7,732	26,029	284,756	20	477	8,938	1,573,155
	1965-66	24,315	2,151	15,475	21,836	14,916	8,963	24,821	301,088	13	756	7,381	1,558,197
	1966-67	26,435	2,520	18,278	24,871	16,576	10,500	28,514	336,472	6	543	8,145	1,805,341
	1967-68	28,376	3,034	18,982	22,483	18,107	10,719	30,281	360,937	10	802	7,272	1,934,697
	1968-69	29,980	2,589	18,177	22,090	18,896	11,228	27,057	384,762	5	709	9,414	1,837,139
	1969-70	37,280	2,990	20,146	26,760	19,737	13,094	33,183	438,372	10	916	7,170	2,072,108
	1970-71	36,090	2,274	22,044	31,730	21,659	14,005	44,543	496,387	15	860	10,116	2,420,244
	1971-72	32,646	3,420	19,757	30,727	20,731	15,750	33,576	501,289	9	931	33,326	2,445,977
$5 stamp	1972-73	30,758	2,467	20,708	25,240	18,224	13,061	28,387	438,477	23	893	6,983	2,184,343
	1973-74	33,756	1,791	18,970	24,392	18,346	12,177	28,615	434,851	17	912	15,179	2,094,414
	1974-75	38,001	2,682	19,771	28,982	20,744	13,207	26,385	448,849	0	908	33,269	2,214,056

[c] Sales, if any, included in the Washington, D.C. total until the 1940-41 season.

Table A-7. Boundaries of U. S. mallard harvest areas as defined for the current mallard study.

State	Harvest area	Counties included
Alabama	1	Entire State.
Alaska	1	Entire State.
Arizona	1	Entire State.
Arkansas	1	Sharp, Independence, Cleburne, Faulkner, Pulaski, Grant, Dallas, Calhoun, Union, and all counties west thereof.
	2	Randolph, Lawrence, Jackson, Cross, St. Francis, and all counties east thereof.
	3	Arkansas, Jefferson, Lee, Lonoke, Monroe, Phillips, Prairie, Woodruff, and White.
	4	Ashley, Bradley, Chicot, Cleveland, Desha, Drew, and Lincoln.
California	1	Humboldt, Plumas, Sierra, Tehama, Trinity, and all counties north thereof.
	2	Amador, Butte, El Dorado, Glenn, Mendocino, Nevada, Placer, San Joaquin, San Mateo, Santa Clara, Yuba, and all counties west thereof.
	3	Calaveras, Fresno, Kern, Kings, Madera, Mariposa, Merced, Monterey, San Benito, Santa Cruz, San Luis Obispo, Tulare, Toulumne, and Stanislaus.
	4	Alpine, Inyo, Los Angeles, Mono, San Bernardino, Santa Barbara, Ventura, and all counties south thereof.
Colorado	1	Archuleta, Eagle, Grand, Gunnison, Hinsdale, Pitkin, Routt, Summit, and all counties west thereof.
	2	Alamosa, Conejos, Costilla, Mineral, Rio Grande, and Saguache.
	3	Boulder, Chaffee, Clear Creek, Custer, Fremont, Gilpin, Huerfano, Jackson, Lake, Larimer, Las Animas, Park, and all counties east thereof.
Connecticut	1	Entire State.
Delaware	1	Entire State.
Florida	1	Entire State.
Georgia	1	Entire State.
Idaho	1	Blaine, Butte, Cassia, Lemhi, and all counties north and west thereof.
	2	All counties east of area 1.
Illinois	1	Bureau, Christian, Jersey, Lee, Logan, Macoupin, Marshall, Montgomery, Ogle, Putnam, Sangamon, Tazewell, Winnebago, Woodford, and all counties west and north thereof.
	2	Boone, Clark, Cumberland, DeKalb, De Witt, La Salle, Livingston, Macon, McLean, Shelby, and all counties east and north thereof.
	3	Bond, Crawford, Effingham, Fayette, Jasper, Madison, and all counties south thereof.
Indiana	1	Entire State.
Iowa	1	Cerro Gordo, Franklin, Hardin, Lucas, Polk, Story, Warren, Wayne, Worth, and all counties west thereof.
	2	All counties east of area 1.

Table A-7.--continued. Boundaries of U. S. mallard harvest areas as defined for the current mallard study.

State	Harvest area	Counties included
Kansas	1	Decatur, Finney, Gove, Gray, Lane, Meade, Sheridan, and all counties west thereof.
	2	Clay, Dickinson, Harvey, Marion, Sedgwick, Sumner, Washington, and all counties west thereof but east of area 1.
	3	All counties east of area 2.
Kentucky	1	Hancock, Muhlenberg, Ohio, Todd, and all counties west thereof.
	2	All counties east of area 1.
Louisiana	1	Catahoula, Concordia, Grant, La Salle, Natchitoches, Sabine, and all counties north thereof.
	2	Avoyelles, Lafayette, Rapides, St. Landry, Vermillion, Vernon, and all counties south and west thereof.
	3	Iberia, Pointe Coupee, St. Martin, West Feliciana, and all counties east thereof.
Maine	1	Entire State.
Maryland	1	Entire State.
Massachusetts	1	Entire State.
Michigan	1	Chippewa, Delta, Mackinac, Menominee, Schoolcraft, and all counties north thereof.
	2	Alcona, Alpena, Cheboygan, Emmet, Gladwin, Iosco, Isabella, Mecosta, Midland, Muskegon, Newaygo, Ogemaw, Presque Isle, and all counties west thereof.
	3	All counties south of area 2.
Minnesota	1	Becker, Kittson, Mahnomen, Marshall, Pennington, Polk, Otter Tail, Red Lake, Clay, Norman, and Wilkin.
	2	Beltrami, Carlton, Clearwater, Itasca, Roseau, and all counties east thereof.
	3	Aitkin, Benton, Cass, Crow Wing, Hubbard, Kanabec, Mille Lacs, Morrison, Pine, Todd, and Wadena.
	4	Brown, Douglas, Grant, Martin, Meeker, Renville, Stearns, Traverse, Watonwan, and all counties south and west thereof.
	5	Blue Earth, Chisago, Faribault, Isanti, McLeod, Nicollet, Sherburne, Sibley, Wright, and all counties east thereof.
Mississippi	1	Carroll, De Soto, Holmes, Humphreys, Grenada, Panola, Tallahatchie, Tate, Washington, and all counties north and west thereof.
	2	All counties south and east of area 1.
Missouri	1	Adair, Cooper, Howard, Jackson, Lafayette, Macon, Randolph, Saline, Schuyler, and all counties north and west thereof.
	2	Audrain, Boone, Cole, Franklin, Gasconade, Jefferson, Knox, Moniteau, Monroe, Osage, Shelby, Scotland, and all counites north and east thereof.
	3	Cass, Douglas, Johnson, Laclede, Miller, Morgan, Ozark, Pettis, Pulaski, Wright, and all counties south and west thereof.
	4	Crawford, Howell, Maries, Phelps, St. Francois, Ste. Genevieve, Texas, Washington, and all counties south and east thereof.

Table A-7.--continued. Boundaries of U. S. mallard harvest areas as defined for the current mallard study.

State	Harvest area	Counties included
Montana	1	Deer Lodge, Flathead, Granite, Lake, Lincoln, Mineral, Missoula, Powell, Ravalli, Sanders, and Silver Bow.
	2	Cascade, Chouteau, Hill, Meagher, Park, and all counties west thereof but east of area 1.
	3	All counties east of area 2.
Nebraska	1	Cherry, Frontier, Lincoln, Logan, Red Willow, Thomas, and all counties west thereof.
	2	Antelope, Boone, Boyd, Clay, Hamilton, Holt, Merrick, Nance, Nuckolls, and all counties west thereof but east of area 1.
	3	All counties east of area 2.
Nevada	1	Churchill, Esmeralda, Humboldt, Lander, Mineral, and all counties west thereof.
	2	All counties east of area 1.
New Hampshire	1	Entire State.
New Jersey	1	Entire State.
New York	1	Broome, Cortland, Lewis, Madison, Oneida, St. Lawrence, and all counties west thereof.
	2	Chenango, Delaware, Franklin, Hamilton, Herkimer, Orange, Otsego, Rockland, Sullivan, Westchester, and all counties north and east thereof.
	3	Bronx, Kings, Nassau, New York, Queens, Richmond, and Suffolk.
New Mexico	1	Catron, Grant, Hidalgo, McKinley, and San Juan.
	2	All counties east of area 1.
North Carolina	1	Entire State.
North Dakota	1	Burleigh, Divide, Dunn, Emmons, McKenzie, McLean, Williams, and all counties west thereof.
	2	Barnes, Benson, Eddy, Foster, Pierce, Ransom, Rolette, Sargent, Stutsman, and all counties west thereof but east of area 1.
	3	All counties east of area 2.
Ohio	1	Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, and Sandusky.
	2	All counties not listed for area 1.
Oklahoma	1	Canadian, Garfield, Grady, Grant, Jefferson, Kingfisher, Stephens, and all counties west thereof.
	2	All counties east of area 1.
Oregon	1	Clackamas, Douglas, Jackson, Lane, Linn, Marion, Multnomah, and all counties west thereof.
	2	Crook, Grant, Hood River, Deschutes, Jefferson, Malheur, Wasco, and all counties north and east thereof.
	3	Klamath, Harney, and Lake.

Table A-7.--continued. Boundaries of U. S. mallard harvest areas as defined for the current mallard study.

State	Harvest area	Counties included
Pennsylvania	1	Bradford, Cambria, Centre, Clearfield, Clinton, Lycoming, Somerset, Sullivan, and all counties west thereof.
	2	All counties east of area 1.
Rhode Island	1	Entire State.
South Carolina	1	Entire State.
South Dakota	1	Campbell, Hughes, Jones, Mellette, Potter, Stanley, Sully, Todd, Walworth, and all counties west thereof.
	2	All counties east of area 1.
Tennessee	1	Decatur, Hardin, Houston, Humphreys, Montgomery, Perry, and all counties west thereof.
	2	All counties east of area 1.
Texas	1	Archer, Bandera, Blanco, Baylor, Callahan, Coleman, Edwards, Kendall, Llano, McCulloch, Real, San Saba, Shackelford, Throckmorton, Val Verde, Wichita, and all counties west thereof.
	2	Brown, Burnet, Clay, Comal, Eastland, Fayette, Grimes, Gonzales, Guadalupe, Hardin, Hays, Jasper, Lampasas, Liberty, Mills, Montgomery, Newton, Stephens, Travis, Washington, Young, and all counties north and east thereof.
	3	All counties south of areas 1 and 2.
Utah	1	Duchesne, Tooele, Unitah, Utah, and all counties north thereof.
	2	All counties south of area 1.
Vermont	1	Entire State.
Virginia	1	Entire State.
Washington	1	King, Lewis, Pierce, Skagit, Skamania, Snohomish, Whatcom, and all counties west thereof.
	2	All counties east of area 1.
West Virginia	1	Entire State.
Wisconsin	1	Chippewa, Dunn, Florence, Forest, Langlade, Lincoln, Pierce, Taylor, and all counties north thereof.
	2	Clark, Eau Claire, Iowa, Jackson, Lafayette, Monroe, Pepin, Richland, Vernon, and all counties west thereof.
	3	Dane, Green, Juneau, Marinette, Menominee, Marathon, Oconto, Sauk, Shawano, Wood, and all counties east thereof.
Wyoming	1	Lincoln, Sublette, Sweetwater, Teton, and Unita.
	2	All counties east of area 1.

Table A-8. Summary, by flyway, of annual estimates of the percentages of the total duck bag composed of "normal wild" mallards, "abnormal" mallards (those having wing characteristics indicative of bloodlines other than normal wild), and total mallards together with bias-adjusted estimates of the total bag of each, 1961-1974.

Hunting season		Alaska		Pacific Flyway		Central Flyway		Mississippi Flyway		Atlantic Flyway		Entire United States			
												Excluding Alaska		Including Alaska	
		Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number
1961-62	Normal			35.0	722,400	51.9	409,000	49.6	866,900	14.2	105,000	39.4	2,103,300		
	Abnormal			tr.	600	0.1	400	tr.	600	0.3	2,400	0.1	4,000		
	Total			35.0	723,000	51.9	409,400	49.7	867,500	14.6	107,400	39.5	2,107,300		
1962-63	Normal			33.3	647,900	44.5	190,500	38.8	437,700	15.6	116,000	32.8	1,392,100		
	Abnormal			0.1	2,500	0.1	300	0.1	1,700	0.2	1,700	0.1	6,000		
	Total			33.4	650,400	44.6	190,800	38.9	439,300	15.9	117,700	32.9	1,398,200		
1963-64	Normal			33.4	945,300	40.8	413,200	37.0	926,300	15.1	137,100	33.4	2,421,800		
	Abnormal			tr.	600	tr.	200	0.2	4,200	0.4	3,400	0.1	8,400		
	Total			33.4	945,900	40.8	413,300	37.1	930,500	15.5	140,400	33.5	2,430,200		
1964-65	Normal			38.1	963,500	39.4	520,000	37.3	1,321,000	16.4	163,000	35.4	2,967,500		
	Abnormal			tr.	400	tr.	100	0.1	2,200	0.1	1,400	tr.	4,100		
	Total			38.1	963,900	39.4	520,100	37.4	1,323,200	16.5	164,300	35.5	2,971,600		
1965-66	Normal			35.4	1,030,500	27.4	333,600	25.4	919,200	15.7	160,800	27.9	2,444,000		
	Abnormal			tr.	800	0	0	0.1	5,200	0.3	3,200	0.1	9,100		
	Total			35.4	1,031,200	27.4	333,600	25.5	924,400	16.1	163,900	28.0	2,453,100		
1966-67	Normal	25.4	12,400	33.3	1,174,000	32.9	701,900	33.6	1,650,100	15.7	223,100	31.3	3,749,100	31.2	3,761,400
	Abnormal	0	0	0.1	2,000	tr.	600	0.1	3,600	0.1	1,500	0.1	7,800	0.1	7,800
	Total	25.4	12,400	33.4	1,176,000	32.9	702,600	33.7	1,653,700	15.8	224,600	31.4	3,756,800	31.3	3,769,200
1967-68	Normal	29.8	19,500	31.9	1,393,800	36.6	819,400	36.3	1,732,400	17.2	231,400	32.8	4,177,000	32.8	4,196,500
	Abnormal	0	0	tr.	700	tr.	200	0.1	4,600	0.2	2,500	0.1	8,000	0.1	8,000
	Total	29.8	19,500	31.9	1,394,500	36.6	819,600	36.4	1,737,000	17.4	233,900	32.9	4,185,000	32.9	4,204,600
1968-69	Normal	24.6	17,000	33.5	1,012,600	45.0	557,200	34.9	830,900	18.8	257,800	33.2	2,658,600	33.1	2,675,600
	Abnormal	0	0	tr.	300	tr.	100	0.1	3,400	0.5	6,200	0.1	10,000	0.1	10,000
	Total	24.6	17,000	33.5	1,013,000	45.1	557,300	35.0	834,300	19.2	264,000	33.3	2,668,600	33.2	2,685,600
1969-70	Normal	28.4	12,400	28.9	1,175,300	31.3	813,700	31.9	1,431,600	18.3	330,400	29.0	3,750,900	28.9	3,763,300
	Abnormal	0	0	tr.	600	tr.	200	0.1	2,300	0.2	3,800	0.1	6,900	0.1	6,900
	Total	28.4	12,400	28.9	1,175,900	31.3	813,900	31.9	1,433,900	18.5	334,100	29.0	3,757,800	29.0	3,770,200
1970-71	Normal	32.5	20,000	30.3	1,337,900	35.6	1,068,000	39.2	2,531,600	17.9	356,200	33.4	5,293,700	33.4	5,313,700
	Abnormal	0	0	tr.	1,100	tr.	400	tr.	3,000	0.3	5,600	0.1	10,100	0.1	10,100
	Total	32.5	20,000	30.3	1,339,000	35.7	1,068,300	39.3	2,534,600	18.2	361,900	33.5	5,303,700	33.4	5,323,800
1971-72	Normal	33.2	22,600	31.8	1,264,400	44.1	1,231,800	40.2	2,163,700	19.7	339,100	36.0	4,999,000	36.0	5,021,600
	Abnormal	0.1	100	tr.	1,700	tr.	400	0.1	5,800	0.4	6,300	0.1	14,100	0.1	14,200
	Total	33.3	22,600	31.8	1,266,100	44.1	1,232,300	40.3	2,169,500	20.0	345,300	36.1	5,013,100	36.1	5,035,800
1972-73	Normal	26.6	24,600	33.9	1,312,900	42.3	1,255,400	39.0	1,950,100	21.7	358,000	36.1	4,876,400	36.1	4,901,000
	Abnormal	0	0	0.1	2,200	tr.	1,300	0.1	6,500	0.5	7,800	0.1	17,700	0.1	17,700
	Total	26.6	24,600	34.0	1,315,100	42.4	1,256,700	39.1	1,956,500	22.3	365,800	36.3	4,894,100	36.2	4,918,700
1973-74	Normal	28.0	23,500	35.8	1,152,300	41.2	1,007,000	36.8	1,687,900	21.7	335,800	35.4	4,183,000	35.4	4,206,500
	Abnormal	0	0	tr.	1,200	tr.	300	0.2	8,300	0.5	8,000	0.2	17,900	0.2	17,900
	Total	28.0	23,500	35.8	1,153,600	41.2	1,007,300	36.9	1,696,300	22.2	343,800	35.6	4,200,900	35.5	4,224,400
1974-75	Normal	28.4	15,300	32.4	1,166,700	36.5	809,500	43.2	2,244,900	22.1	383,600	36.1	4,604,600	36.1	4,619,900
	Abnormal	0	0	0.1	3,900	0	0	0.2	8,100	0.6	10,000	0.2	22,000	0.2	22,000
	Total	28.4	15,300	32.5	1,170,500	36.5	809,500	43.4	2,253,000	22.7	393,600	36.3	4,626,600	36.3	4,641,900

Not in survey

Alaska not in survey

Table A-9. Annual estimates of the percentages of the total duck bag composed of "normal wild" mallards, "abnormal" mallards (those having wing characteristics indicative of bloodlines other than normal wild), and total mallards together with bias-adjusted estimates of the total bag of each in the seven States having the largest numbers of abnormal mallards in the bag, in order of decreasing magnitude, 1961-1974

Hunting season		Maryland		Illinois		Pennsylvania		Wisconsin		Minnesota		New York		California	
		Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number
1961-62	Normal	17.0	9,100	62.9	128,800	42.7	18,800	48.8	151,700	46.3	175,000	18.4	30,000	18.8	197,000
	Abnormal	0.6	300	0.1	100	1.0	400	0	0	0	0	0.5	800	tr.	200
	Total	17.6	9,400	63.0	128,900	43.7	19,300	48.8	151,700	46.3	175,000	18.9	30,800	18.8	197,200
1962-63	Normal	23.9	14,400	49.0	40,200	38.3	19,300	36.8	77,500	39.5	113,600	16.9	23,700	17.4	167,000
	Abnormal	0.3	200	0.7	600	1.1	500	tr.	100	0.1	200	0.2	300	0.1	1,300
	Total	24.2	14,500	49.7	40,800	39.4	19,900	36.8	77,600	39.6	113,800	17.1	23,900	17.5	168,300
1963-64	Normal	18.3	10,200	55.3	101,500	40.7	27,300	33.3	97,800	39.9	228,300	20.3	24,500	18.3	267,500
	Abnormal	1.1	600	0.4	800	1.3	900	0.1	400	0.2	1,000	0.6	700	tr.	200
	Total	19.5	10,900	55.7	102,300	42.0	28,200	33.4	98,200	40.1	229,300	20.9	25,300	18.3	267,800
1964-65	Normal	17.1	15,400	59.0	113,900	41.4	33,200	36.2	150,800	30.5	271,000	22.8	33,500	20.0	249,000
	Abnormal	0.3	200	0.1	200	0.4	400	0.1	400	0.1	500	0.1	200	0	0
	Total	17.3	15,600	59.1	114,200	41.8	33,500	36.2	151,200	30.6	271,400	22.9	33,700	20.0	246,000
1965-66	Normal	17.1	13,000	43.7	89,600	38.9	32,800	22.4	106,000	20.5	162,300	22.3	38,300	20.2	295,000
	Abnormal	0.7	500	1.1	2,300	1.5	1,200	0.4	2,000	tr.	300	tr.	100	tr.	400
	Total	17.8	13,500	44.8	91,900	40.4	34,000	22.8	108,000	20.6	162,600	22.3	38,400	20.2	295,400
1966-67	Normal	15.5	27,200	48.6	179,700	41.1	40,500	32.1	186,600	30.3	284,600	21.1	41,100	16.5	288,400
	Abnormal	0.2	300	0.3	900	0.2	200	0	0	0.2	1,500	0.1	200	tr.	400
	Total	15.6	27,500	48.9	180,600	41.3	40,600	32.1	186,600	30.4	286,100	21.3	41,400	16.6	288,800
1967-68	Normal	24.4	21,900	54.5	208,600	44.3	51,900	32.3	175,900	33.7	329,500	21.3	53,000	18.2	446,000
	Abnormal	0.6	600	0.3	1,100	0.6	800	0	0	0.1	800	0.2	500	tr.	500
	Total	25.1	22,500	54.8	209,700	44.9	52,600	32.3	175,900	33.8	330,300	21.5	53,500	18.2	446,500
1968-69	Normal	26.9	22,800	57.0	83,000	46.4	49,800	31.2	94,200	27.4	152,100	25.6	65,000	17.7	236,200
	Abnormal	3.8	3,200	0.4	600	0.7	700	0.2	500	0.2	1,000	0.2	400	0	0
	Total	30.7	26,000	57.3	83,600	47.1	50,500	31.3	94,700	27.6	153,100	25.7	65,500	17.7	236,200
1969-70	Normal	19.9	42,800	54.0	140,200	46.8	58,600	28.2	157,100	20.7	223,800	28.9	99,400	15.0	331,700
	Abnormal	0.7	1,500	0	0	0.5	600	0.3	1,700	0	0	0.1	500	0	0
	Total	20.6	44,300	54.0	140,200	47.3	59,300	28.5	158,800	20.7	223,800	29.0	99,900	15.0	331,700
1970-71	Normal	42.0	47,500	54.2	240,500	48.8	65,500	33.1	190,200	31.4	298,900	24.2	82,200	15.1	371,000
	Abnormal	1.0	1,100	0.2	900	0.4	500	tr.	300	0	0	0.3	1,000	tr.	900
	Total	43.0	48,700	54.4	241,300	49.2	66,100	33.1	190,500	31.4	298,900	24.5	83,200	15.2	371,900
1971-72	Normal	27.8	38,200	55.3	166,700	43.4	68,500	34.4	225,200	26.3	278,800	26.1	79,800	15.1	313,400
	Abnormal	0.5	700	1.0	3,000	0.6	900	tr.	200	0.1	800	0.4	1,300	tr.	900
	Total	28.3	38,900	56.3	169,700	44.0	69,400	34.5	225,400	26.4	279,600	26.5	81,200	15.1	314,200
1972-73	Normal	38.3	38,800	59.2	219,300	40.8	55,400	34.1	190,400	36.9	354,900	29.4	91,800	16.2	321,800
	Abnormal	0.4	400	0.1	300	1.6	2,200	0.1	700	0.2	2,000	0.3	900	tr.	900
	Total	38.7	39,200	59.2	219,600	42.5	57,600	34.2	191,100	37.1	356,900	29.7	92,700	16.2	322,700
1973-74	Normal	29.9	31,500	50.2	168,600	46.7	51,800	36.1	187,000	27.8	165,000	35.1	105,200	15.1	219,400
	Abnormal	0.8	800	0.2	700	2.3	2,500	0.3	1,600	0.2	1,000	0.5	1,600	tr.	600
	Total	30.6	32,300	50.4	169,200	49.0	54,300	36.4	188,500	27.9	165,900	35.6	106,700	15.2	220,000
1974-75	Normal	37.6	37,900	58.6	172,200	50.0	80,800	45.3	300,300	33.1	254,800	37.0	99,800	15.2	292,300
	Abnormal	2.8	2,900	0.2	600	0.7	1,100	0.4	3,000	0.2	1,300	0.4	1,100	tr.	700
	Total	40.4	40,800	58.8	172,800	50.6	81,800	45.7	303,200	33.3	256,100	37.5	101,000	15.2	293,000

Table A-10. Summary, by State, of annual bias-adjusted estimates of percentages of the total duck bag composed seasons included; estimates summarized by State of duck stamp purchase through 1960 and by State

State and Flyway	Parameter estimated	Hunting 1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60	1960-61	1961-62
Alaska	Percent	33.4	36.7	41.4	57.5	← Not in survey →					
	Number	19,900	20,800	24,800	26,500						
Pacific Flyway											
Wash.	Percent	37.4	39.7	50.0	47.7	39.8	50.8	48.6	50.2	51.7	51.9
	Number	272,600	195,400	283,100	376,400	244,300	341,900	331,800	222,900	207,200	211,000
Oregon	Percent	65.4	56.1	49.1	52.9	49.7	49.5	50.0	33.0	42.9	42.7
	Number	368,600	225,800	208,600	310,300	178,600	218,600	200,700	90,700	100,800	85,100
Idaho	Percent	84.1	89.7	76.2	61.0	72.1	69.5	68.7	69.7	74.7	71.4
	Number	199,800	376,100	296,400	214,000	204,700	208,000	219,700	149,200	121,900	138,800
Montana	Percent	← Entire State in Central Flyway →									81.0
	Number										44,400
Wyoming	Percent	← Entire State in Central Flyway →									
	Number										
Calif.	Percent	19.3	17.0	17.6	17.7	18.2	19.4	18.4	20.5	15.1	18.8
	Number	494,700	445,600	347,800	336,900	368,100	503,300	442,700	191,800	220,800	197,200
Nevada	Percent	62.2	53.4	45.5	59.8	60.9	55.0	[54.0][b]	58.7	44.9	38.7
	Number	66,200	52,800	43,200	52,300	42,200	44,500	48,300	41,300	15,900	8,900
Utah	Percent	35.9	34.1	39.6	43.5	43.5	45.4	23.9	28.6	40.5	29.4
	Number	144,400	96,600	116,600	88,500	86,800	100,300	78,400	61,800	76,200	35,200
Colorado	Percent	← Entire State in Central Flyway →									
	Number										
Arizona	Percent	31.5	32.4	32.0	24.1	22.8	16.8	[16.0]	17.5	18.8	11.8
	Number	32,300	9,700	9,700	13,800	12,600	8,300	9,500	5,000	4,800	2,300
New Mex.	Percent	← Entire State in Central Flyway →									
	Number										
Central Flyway											
Montana	Percent	80.4	73.6	68.6	79.8	73.5	76.6	67.0	61.6	72.1	70.9
	Number	232,500	52,800	87,700	182,100	92,800	141,300	109,200	49,100	58,500	30,300[a]
North Dak.	Percent	71.8	44.0	50.6	59.3	60.9	66.6	67.8	66.3	67.9	74.1
	Number	330,100	184,400	193,700	219,900	228,500	310,400	164,000	93,800	129,300	57,500
South Dak.	Percent	47.7	38.8	41.7	59.6	58.4	55.0	60.9	58.9	55.0	73.6
	Number	152,600	136,900	148,200	133,400	171,600	289,100	124,500	70,100	122,700	65,600
Wyoming	Percent	87.1	64.3	53.7	83.6	75.0	65.3	77.8	83.4	72.9	74.1
	Number	79,100	48,000	26,900	51,800	30,700	47,200	40,000	20,900	20,300	15,100
Nebraska	Percent	67.5	82.8	48.9	74.6	56.5	55.8	56.7	54.0	57.6	84.5
	Number	185,800	318,200	166,900	356,500	247,800	380,100	231,300	136,100	90,500	93,500
Colorado	Percent	69.6	66.4	86.0	81.9	74.8	61.6	56.9	67.4	70.8	83.5
	Number	118,800	65,000	107,600	145,900	120,200	130,100	112,600	67,900	73,500	46,000
Kansas	Percent	37.0	48.0	52.8	43.7	38.9	26.6	37.0	45.9	47.4	32.9
	Number	38,400	79,400	74,500	123,300	108,500	184,100	164,400	86,500	79,700	37,800
New Mex.	Percent	(54.7)[c]	56.0	43.3	46.4	38.7	23.9	33.9	65.8	57.7	34.8
	Number	72,500	19,900	13,400	23,900	19,300	14,100	21,900	4,700	4,700	3,400
Oklahoma	Percent	23.8	31.3	39.3	47.1	33.3	29.4	50.6	38.4	47.0	50.2
	Number	43,000	74,200	46,900	96,700	117,300	74,400	87,900	24,700	60,700	30,500
Texas	Percent	36.8	25.7	39.6	26.0	27.3	22.9	21.7	23.8	22.8	14.3
	Number	401,000	306,100	249,400	248,400	240,600	158,000	146,600	80,200	82,500	29,600
Mississippi Flyway											
Minnesota	Percent	36.9	38.4	33.7	46.1	44.0	41.6	49.4	36.0	45.4	46.3
	Number	504,100	508,300	236,300	391,800	452,300	514,000	447,900	230,500	365,700	175,000
Wisconsin	Percent	19.9	28.9	34.3	34.6	40.5	43.0	47.2	36.5	34.0	48.8
	Number	142,500	188,400	207,200	220,500	194,100	197,500	189,800	115,300	145,700	151,700
Michigan	Percent	25.8	33.4	31.3	29.9	36.1	34.1	35.3	23.8	31.2	37.3
	Number	60,000	78,300	110,900	143,600	132,500	148,100	82,300	53,700	75,400	46,600

a/ Flyway boundary changed this year.
b/ 1958 records incomplete because of loss of documents in fire; estimates in brackets are approximations
c/ Estimates in parentheses based on information pertaining to fewer than 100 ducks.

of mallards and total numbers of mallards bagged, 1952-1974. (All mallard bloodlines and all U. S. waterfowl of kill thereafter.)

Season													
1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1961-1970 Average	1971-72	1972-73	1973-74	1974-75
→				25.4 12,400	29.8 19,500	24.6 17,000	28.4 12,400	32.5 20,000	28.2 16,300	33.3 22,600	26.6 24,600	28.0 23,500	28.4 15,300
46.9 176,900	49.1 228,600	59.3 262,600	58.1 298,200	56.0 301,200	56.3 295,500	48.5 265,700	46.9 244,100	53.9 310,700	52.8 259,500	60.9 298,800	58.5 316,700	63.7 350,900	62.6 302,700
39.1 91,600	35.1 89,200	41.7 96,900	37.7 93,400	36.1 131,200	42.1 150,100	37.0 126,900	38.8 156,800	40.5 171,100	39.0 119,200	33.2 123,700	45.5 182,800	43.1 150,000	46.8 131,300
74.9 121,400	76.1 185,400	80.3 201,000	80.0 150,700	79.2 195,100	68.8 238,600	76.6 180,100	73.1 202,400	72.9 203,600	75.0 181,700	79.4 251,100	78.2 267,400	80.3 216,000	77.0 254,900
82.9 27,400	79.5 49,100	80.9 35,600	75.5 [a] 77,900 [a]	70.9 114,100	74.5 106,400	57.3 55,500	68.1 107,300	74.0 95,600	72.5 71,400	74.2 90,900	56.7 76,700	70.9 68,500	67.3 68,300
91.4 8,100	80.5 7,500	85.9 8,200	78.6 6,000	84.4 9,300	86.8 7,700	77.2 8,400	73.6 10,300	83.3 13,400	82.0 8,800	72.0 6,100	77.3 8,600	73.2 7,400	57.5 6,100
17.5 168,300	18.3 267,800	20.0 249,000	20.2 295,400	16.6 288,800	18.2 446,500	17.7 236,200	15.0 331,700	15.2 371,900	17.4 285,300	15.1 314,200	16.2 322,700	15.2 220,000	15.2 293,000
37.0 9,300	39.9 22,200	39.0 28,600	33.9 25,100	32.5 31,900	27.9 30,300	34.9 34,300	22.9 25,400	32.6 39,500	32.4 25,600	30.1 36,000	28.8 25,100	27.9 24,000	25.1 19,500
28.7 32,800	32.3 76,500	35.1 58,300	24.4 64,400	26.1 74,000	26.3 85,600	29.2 84,900	25.1 65,000	32.3 102,700	28.6 67,900	31.6 107,000	36.0 82,500	25.1 85,400	23.3 63,900
94.5 9,300	87.7 12,000	80.9 16,400	84.0 11,300	79.1 18,600	76.8 22,000	79.1 13,300	86.8 17,100	81.5 17,600	82.1 15,300	70.5 22,700	64.8 17,600	87.6 21,400	70.8 20,000
21.7 4,200	17.9 4,800	14.1 5,800	10.3 3,500	18.8 9,100	14.3 10,000	12.1 5,800	16.5 13,400	13.7 10,500	14.9 6,900	14.8 14,500	13.1 12,900	19.3 8,000	11.0 9,400
(78.9) 1,100	53.3 3,000	57.6 1,600	(63.6) 5,300	53.4 2,500	37.7 1,900	32.4 1,700	(62.2) 2,200	(38.6) 2,400	50.6 2,400	(17.7) 1,200	(27.8) 2,100	42.9 2,100	23.4 1,600
67.4 3,900	81.9 19,700	67.1 24,700	51.7 [a] 8,100 [a]	75.0 20,100	73.7 16,200	85.8 19,700	77.7 34,000	85.1 42,700	75.4 21,900	91.9 51,800	84.3 36,600	74.5 22,200	66.4 22,000
63.5 58,800	53.8 91,300	54.5 115,200	43.9 91,700	46.2 166,500	44.3 160,300	46.6 98,300	39.8 162,800	52.1 202,900	48.4 120,500	53.5 237,900	62.6 260,200	52.8 120,900	53.2 192,500
52.1 41,000	43.3 93,100	53.5 89,200	27.5 52,600	39.2 123,700	48.1 149,700	57.8 70,600	41.0 110,200	54.1 136,800	46.3 93,200	52.1 194,200	54.0 176,900	59.4 181,100	44.3 64,600
79.5 [a] 2,900 [a]	73.9 6,500	66.2 12,400	15.3 700	46.8 10,300	52.2 12,300	79.7 18,300	66.6 17,000	69.3 25,000	64.6 12,100	68.3 29,000	69.7 25,300	70.2 24,800	71.3 18,200
56.0 18,500	51.8 52,900	53.4 74,500	42.2 43,100	55.0 102,600	52.3 153,100	56.7 80,200	53.1 156,000	56.4 191,500	55.5 96,600	60.2 181,900	60.2 172,800	48.8 146,600	56.2 66,200
75.0 [a] 11,900 [a]	75.5 56,700	75.1 50,800	59.7 40,300	59.7 62,600	66.1 96,700	84.9 76,100	69.6 80,800	70.9 115,100	70.8 63,700	62.8 137,900	65.1 113,200	60.1 93,900	53.0 56,100
30.6 10,400	27.7 24,500	29.9 35,200	21.5 26,700	36.0 57,400	33.7 100,300	52.1 78,300	33.2 86,600	33.9 117,100	33.9 57,400	43.8 206,600	49.8 212,800	41.9 154,800	42.3 123,800
49.5 [a] 1,800 [a]	36.2 8,200	32.1 5,600	14.7 2,400	28.4 7,900	33.2 8,900	47.6 11,800	43.9 9,700	35.0 11,600	34.9 7,100	31.2 9,000	31.2 9,700	35.2 4,700	36.5 14,100
39.4 9,300	31.5 12,300	43.2 38,300	18.5 14,100	36.1 52,900	26.1 50,100	62.6 44,000	31.7 47,200	37.1 68,500	35.6 36,700	43.6 90,400	46.4 105,200	43.9 103,100	50.4 102,700
23.5 32,200	18.1 48,300	16.2 74,200	13.1 54,000	12.6 98,600	12.7 72,100	15.7 60,000	10.9 109,600	13.1 157,100	13.6 73,600	14.4 93,500	14.4 144,000	20.1 155,200	16.7 149,200
39.6 113,800	40.1 229,300	30.6 271,400	20.6 162,600	30.4 286,100	33.8 330,300	27.6 153,100	20.7 223,800	31.4 298,900	30.2 224,400	26.4 279,600	37.1 356,900	27.9 165,900	33.3 256,100
36.8 77,600	33.4 98,200	36.2 151,200	22.8 108,000	32.1 186,600	32.3 175,900	31.3 94,700	28.5 158,800	33.1 190,500	32.6 139,300	34.5 225,400	34.2 191,100	36.4 188,500	45.7 303,200
32.0 32,700	30.5 41,000	23.7 48,500	19.0 43,700	23.1 73,000	26.8 100,100	32.3 64,500	28.8 99,600	29.5 111,600	27.4 66,100	27.1 84,900	30.8 123,400	43.7 156,200	40.5 172,300

based on trends.

Table A-10.--continued. Summary, by State, of annual bias-adjusted estimates of percentages of the total duck waterfowl seasons included; estimates summarized by State of duck stamp purchase through 1960 and

State and Flyway	Parameter estimated	Hunting 1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60	1960-61	1961-62
Iowa	Percent	53.1	70.3	49.7	50.1	45.1	48.5	57.8	55.5	49.8	63.6
	Number	87,500	97,300	78,400	125,400	128,200	134,700	116,400	99,100	85,700	88,700
Illinois	Percent	60.6	47.8	73.8	75.9	76.3	81.5	71.3	62.4	67.5	63.0
	Number	184,000	107,800	281,300	434,400	406,800	533,700	300,700	143.100	163,600	128,900
Indiana	Percent	66.7	36.2	66.5	69.4	79.0	73.9	79.7	63.8	59.9	53.2
	Number	88,700	49,100	34,100	104,600	70,700	53,300	84,200	27,000	27,600	13,400
Ohio	Percent	29.7	32.7	44.5	39.3	49.6	40.7	39.4	32.5	32.1	34.9
	Number	18,700	54,200	31,100	54,000	54,600	48,800	43,300	32,700	39,300	17,700
Missouri	Percent	55.4	41.1	71.3	75.9	76.4	86.1	78.0	76.7	79.6	65.6
	Number	172,700	96,900	175,700	375,000	315,100	429,200	225,600	106,300	139,600	81,700
Kentucky	Percent	(50.7)	(80.5)	79.8	67.8	74.4	83.5	78.6	79.7	66.2	75.0
	Number	29,800	71,400	24,800	34,700	41,900	55,800	49,200	23,500	15,600	17,600
Arkansas	Percent	92.2	88.6	84.7	86.7	86.7	84.9	93.0	88.7	90.6	91.1
	Number	623,400	120,500	340,800	421,800	479,000	620,000	666,000	226,700	314,200	62,600
Tennessee	Percent	73.8	(52.5)	76.4	71.9	79.3	78.1	78.8	79.6	66.9	68.5
	Number	148,800	74,400	46,400	96,200	104,300	126,800	157,600	56,400	56,200	32,700
Louisiana	Percent	57.3	44.6	52.1	62.6	61.6	53.4	58.5	30.1	40.0	16.8
	Number	424,900	438,400	483,800	525,600	493,400	445,100	494,300	129,400	140,400	35,500
Miss.	Percent	69.6	73.6	74.4	75.8	91.2	76.5	68.9	39.6	72.2	51.1
	Number	53,600	37,300	31,600	125,000	121,900	83,900	47,100	19,000	38,100	11,600
Alabama	Percent	72.7	40.3	68.4	38.5	66.4	53.6	39.8	22.0	40.2	25.4
	Number	87,400	25,800	36,400	36,900	50,000	31,100	40,800	8,200	14,700	3,800
Atlantic Flyway											
Maine	Percent	0.8	5.3	3.0	4.1	2.2	3.9	4.3	2.8	1.8	1.3
	Number	1,000	2,800	1,400	2,500	1,300	2,400	2,600	1,100	1,000	500
Vermont	Percent	0.7	(18.8)	12.1	6.3	(14.8)	7.2	10.0	13.2	8.9	9.8
	Number	100	2,000	1,200	800	2,100	800	700	1,000	800	1,600
New Hamp.	Percent	(9.0)	(0)	(1.1)	21.6	4.2	8.4	10.8	11.4	8.0	9.2
	Number	1,100	0	100	2,100	900	900	800	700	1,000	1,200
Mass.	Percent	31.1	24.9	8.4	8.0	7.2	7.9	9.0	9.2	8.0	6.2
	Number	7,900	12,600	7,200	6,800	5,900	5,300	6,600	5,100	5,000	3,000
Conn.	Percent	4.0	14.8	5.1	10.2	10.6	8.9	16.4	15.3	13.6	26.2
	Number	1,700	3,500	2,100	4,000	3,300	3,800	5,900	3,300	3,700	4,000
Rhode Is.	Percent	(0)	(0)	10.9	5.9	8.3	7.2	4.7	5.4	3.3	13.8
	Number	0	0	2,100	1,800	1,600	1,700	1,300	700	400	1,600
New York	Percent	18.2	20.2	15.3	17.1	19.4	18.0	18.7	18.2	19.7	18.9
	Number	22,300	52,000	39,400	52,000	44,500	39,100	42,900	28,900	36,300	30,800
Penn.	Percent	36.6	42.5	37.2	42.1	47.7	41.1	44.2	45.6	38.8	43.7
	Number	32,700	27,400	25,100	43,600	43,900	47,500	37,500	24,900	20,400	19,300
West Va.	Percent	(67.6)	(50.0)	(100.0)	(63.6)	51.6	69.2	45.2	(39.5)	19.9	(27.2)
	Number	2,800	2,000	1,100	2,300	4,000	3,300	1,500	900	600	400
New Jersey	Percent	15.3	13.7	14.8	18.8	16.9	16.1	20.5	15.1	13.0	14.4
	Number	18,000	11,800	15,300	26,900	20,500	24,500	15,500	6,200	6,400	6,200
Delaware	Percent	10.0	13.3	17.6	17.6	20.4	25.4	23.3	20.7	16.1	17.1
	Number	3,500	5,100	5,500	8,500	9,200	13,300	9,000	5,300	4,500	5,200
Maryland	Percent	22.4	13.2	17.9	12.1	13.7	13.5	17.2	22.2	18.3	17.6
	Number	42,200	22,300	27,200	27,400	27,000	24,200	18,200	11,600	10,500	9,400
Virginia	Percent	9.2	53.0	30.1	24.8	27.9	24.3	26.5	17.0	16.5	15.9
	Number	14,000	40,100	28,900	46,400	37,400	29,000	24,500	6,700	10,400	5,300
North Car.	Percent	(25.0)	30.4	19.8	20.4	24.4	23.5	22.9	16.3	12.1	9.4
	Number	7,200	24,800	15,800	24,000	26,200	26,300	21,300	12,600	9,300	4,300
South Car.	Percent	31.3	37.5	45.1	52.2	45.4	39.5	30.4	28.5	23.1	24.7
	Number	46,700	31,300	20,500	29,500	26,500	30,200	26,400	8,600	10,100	9,700
Georgia	Percent	(48.1)	36.1	39.8	34.0	25.5	17.7	17.7	17.3	4.2	(1.8)
	Number	7,800	7,400	19,300	17,500	11,400	6,200	7,800	2,400	900	400
Florida	Percent	10.2	11.2	24.0	21.6	21.8	18.0	11.6	10.1	4.6	3.7
	Number	22,900	25,600	53,300	58,900	49,500	38,400	25,900	9,000	5,200	4,500

bag composed of mallards and total numbers of mallards bagged, 1952-1974. (All mallard bloodlines and all U. S. by State of kill thereafter.)

Season													
1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1961-1970 Average	1971-72	1972-73	1973-74	1974-75
47.3	31.2	42.2	36.5	39.3	45.0	42.2	38.4	37.8	41.1	42.8	50.0	47.4	44.8
21,300	43,400	76,800	79,800	121,600	124,900	40,600	89,900	139,500	82,600	161,200	172,200	100,400	106,600
49.7	55.7	59.1	44.8	48.9	54.8	57.3	54.0	54.4	54.0	56.3	59.2	50.4	58.9
40,800	102,300	114,200	91,900	180,600	209,700	83,600	140,200	241,300	133,300	169,700	219,600	169,200	172,800
36.9	49.0	42.7	35.7	42.7	42.3	34.4	32.4	38.2	39.4	48.6	40.6	48.9	41.5
5,100	8,200	15,700	11,300	19,000	20,800	13,900	21,700	33,300	16,200	58,700	32,600	35,700	37,600
22.5	29.2	27.9	22.1	28.7	31.2	23.0	29.1	28.9	28.0	30.4	29.2	39.7	33.9
9,200	19,200	17,500	20,900	30,900	40,700	18,600	34,000	42,400	25,100	34,500	38,800	47,300	38,000
53.3	48.8	56.2	39.5	51.3	52.4	52.0	57.5	48.5	52.3	60.8	61.5	62.9	64.9
13,900	29,500	59,400	49,600	82,300	125,500	55,100	124,900	150,000	77,200	161,900	130,500	108,100	164,800
56.4	62.2	69.1	65.0	62.6	62.7	53.1	63.0	61.4	63.7	69.1	70.0	59.5	64.5
3,800	8,300	18,900	14,200	17,700	22,400	8,400	9,600	35,100	15,600	27,800	39,800	21,500	30,000
77.6	67.9	76.4	63.7	68.6	72.7	79.4	77.7	82.1	75.4	83.2	76.2	70.3	76.9
41,200	93,900	234,100	137,800	257,500	271,600	121,800	183,200	541,500	194,500	514,400	283,100	349,900	530,800
49.8	43.9	64.2	48.5	54.4	50.7	56.0	57.8	57.7	55.6	58.5	58.1	64.4	60.1
7,400	30,700	61,900	27,800	61,800	50,100	31,300	32,000	91,600	42,700	105,800	82,100	128,100	85,100
27.9	26.6	23.5	14.4	20.0	18.5	19.6	21.3	24.8	21.3	21.4	16.5	10.1	16.7
54,300	177,300	209,700	146,400	272,900	205,400	101,900	230,900	499,500	193,400	240,300	191,600	126,800	194,000
46.0	42.1	47.4	26.4	42.5	39.6	51.0	42.7	62.0	46.9	57.3	52.4	53.1	60.8
13,400	36,400	32,800	18,600	45,400	44,800	38,900	67,000	139,400	44,800	90,400	79,700	82,300	147,000
21.3	19.9	20.8	18.3	23.0	23.5	22.0	27.5	25.7	22.8	27.6	23.9	22.0	23.5
4,800	13,000	11,200	11,800	18,400	14,700	7,900	18,300	20,100	12,400	14,900	15,100	16,300	14,600
2.4	1.9	2.3	2.5	2.6	3.3	3.3	3.3	2.8	2.7	3.3	5.0	4.7	7.7
800	800	1,400	1,400	1,800	1,900	2,500	3,300	3,100	1,700	3,200	4,000	4,200	8,900
5.9	10.0	9.8	9.1	13.7	9.5	14.0	10.2	12.4	10.6	16.8	18.5	20.1	17.6
1,400	1,500	2,400	1,800	3,400	2,100	3,500	3,100	4,700	2,600	6,500	6,900	7,600	7,500
3.0	4.3	3.5	5.4	5.4	7.5	9.3	8.6	6.3	6.5	10.0	13.2	21.9	10.6
300	400	700	1,200	1,400	1,100	1,700	2,600	1,400	1,200	2,700	2,600	5,900	3,900
7.9	5.5	6.9	6.9	7.5	12.0	13.5	11.0	9.0	8.9	11.9	16.0	17.7	15.0
3,200	2,500	4,600	4,400	6,900	8,200	8,900	8,800	9,400	6,000	8,800	12,500	16,500	18,600
17.2	15.4	25.6	21.7	25.7	24.7	19.7	17.2	20.7	21.0	27.3	28.3	28.7	30.0
3,800	2,900	5,600	6,700	5,800	6,900	8,000	7,000	10,300	6,100	12,000	11,800	10,600	11,700
9.1	5.0	7.1	5.2	7.3	8.0	10.1	17.0	11.5	9.4	15.5	14.3	15.8	19.0
700	600	800	500	1,100	1,000	2,100	1,700	1,600	1,200	3,000	2,500	1,900	2,700
17.1	20.9	22.9	22.3	21.3	21.5	25.7	29.0	24.5	23.3	26.5	29.7	35.6	37.5
23,900	25,300	33,700	38,400	41,400	53,500	65,500	99,900	83,200	49,500	81,200	92,700	106,700	101,000
39.4	42.0	41.8	40.4	41.3	44.9	47.1	47.3	49.2	44.5	44.0	42.5	49.0	50.6
19,900	28,200	33,500	34,000	40,600	52,600	50,500	59,300	66,100	40,400	69,400	57,600	54,300	81,800
25.4	29.9	19.2	(15.8)	30.9	25.9	24.9	18.9	25.6	24.7	30.8	28.4	30.0	28.9
1,500	1,100	500	500	1,000	1,100	1,400	900	2,800	1,100	1,000	1,400	1,000	1,700
16.1	18.3	16.4	14.7	13.2	16.4	21.2	16.5	17.8	16.7	17.8	22.2	17.4	24.7
11,200	16,500	15,200	14,900	13,900	18,600	23,400	21,300	19,300	16,000	28,300	29,000	24,000	37,200
21.5	18.5	23.9	19.2	24.8	26.6	37.3	29.9	31.0	26.4	22.3	39.4	36.7	31.4
3,400	3,900	6,900	3,900	8,700	8,900	13,000	11,600	18,600	8,400	11,900	20,800	15,700	12,200
24.2	19.5	17.3	17.8	15.6	25.1	30.7	20.6	43.0	23.0	28.3	38.7	30.6	40.4
14,500	10,900	15,600	13,500	27,500	22,500	26,000	44,300	48,700	23,300	38,900	39,200	32,300	40,800
23.1	27.1	25.6	24.3	23.5	23.3	18.6	14.4	18.9	20.7	19.2	23.9	23.1	22.1
10,000	14,000	12,100	9,400	18,200	16,500	13,400	15,900	20,100	13,500	20,600	27,300	22,100	19,700
12.1	13.1	10.7	10.8	13.5	9.3	12.3	12.5	13.7	12.0	12.5	19.2	12.2	11.7
5,900	8,600	8,900	6,500	13,300	10,500	14,900	14,800	21,700	11,000	18,000	24,700	11,200	16,600
22.0	19.7	23.6	21.9	27.2	20.5	15.7	17.3	23.1	21.2	20.6	14.4	15.9	12.6
12,300	14,800	15,200	16,900	31,300	22,000	18,700	23,400	34,100	19,800	20,000	19,000	15,800	17,400
15.4	10.4	17.2	19.4	13.2	13.9	20.5	18.9	11.6	14.5	24.6	16.6	22.4	13.7
2,800	4,900	3,400	7,200	6,100	3,900	7,500	10,500	7,700	5,400	17,800	10,500	13,000	8,900
2.2	2.3	2.8	1.8	0.9	1.3	1.7	2.4	2.3	2.1	1.1	1.7	0.5	1.4
2,100	3,700	3,800	2,600	2,100	2,700	3,000	5,700	9,200	3,900	2,000	3,400	1,000	2,800

Table A-11. Size, age, and sex characteristics of the annual mallard harvest by harvest area and State of harvest,[a] 1960-1974. (All mallard bloodlines and all U. S. waterfowl seasons included; Ad = adult, Im = immature, M = male, F = female.)

State and Flyway	Harvest area	Parameter estimated	Hunting Season 1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1961-1970 Average	1971-72	1972-73	1973-74	1974-75
Alaska	1	Number Ad M							200	1,800	2,000	1,400	3,500	1,800	3,600	2,800	1,200	2,200
		Number Ad F							600	1,800	1,500	900	2,700	1,500	2,500	2,500	1,300	1,500
		Number Im M							6,400	7,800	7,800	4,700	7,600	6,900	6,700	10,100	11,000	6,300
		Number Im F							5,200	8,100	5,700	5,400	6,200	6,100	9,800	9,200	10,000	5,300
		Number Total							12,400	19,500	17,000	12,400	20,000	16,300	22,600	24,600	23,500	15,300
		Percent							25.4	29.8	24.6	28.4	32.5	28.2	33.3	26.6	28.0	28.4
		Im:Ad							14.3 [b]	4.5	3.9	4.5	2.2	4.0	2.7	3.7	8.3	3.2
		M:F (Ad)							(0.4) [b]	(1.0)	(1.3)	(1.5)	1.3	1.2	1.4	1.1	(0.9)	1.4
		M:F (Im)							1.2	1.0	1.4	0.9	1.2	1.1	0.7	1.1	1.1	1.2
Pacific Flyway																		
Wash.	1	Number Ad M		14,400	8,100	11,700	13,700	11,900	12,600	12,300	22,700	12,800	20,600	14,100	19,300	17,400	14,500	17,800
		Number Ad F		14,500	7,300	9,500	11,400	7,100	9,800	8,400	16,500	7,500	18,300	11,000	12,600	15,500	9,800	12,200
		Number Im M		24,100	14,400	26,000	21,600	31,700	18,800	35,000	24,900	26,000	28,500	25,100	26,800	22,800	24,700	37,300
		Number Im F		21,500	15,400	23,500	20,700	31,400	20,300	35,600	17,300	30,500	26,000	24,200	22,300	21,300	23,600	39,000
		Number Total		74,500	45,200	70,600	67,400	82,100	61,500	91,300	81,400	76,900	93,400	74,400	81,000	76,900	72,500	106,300
		Percent		36.1	24.3	32.8	40.0	38.5	36.4	42.6	35.9	35.0	37.0	35.9	39.7	36.7	37.5	48.7
		Im:Ad		1.6	1.9	2.3	1.7	3.3	1.7	3.4	1.1	2.8	1.4	2.0	1.5	1.3	2.0	2.5
		M:F (Ad)		1.0	1.1	1.2	1.2	1.7	1.3	1.5	1.4	1.7	1.1	1.3	1.5	1.1	1.5	1.5
		M:F (Im)		1.1	0.9	1.1	1.0	1.0	0.9	1.0	1.4	0.9	1.1	1.0	1.2	1.1	1.0	1.0
	2	Number Ad M		49,200	46,500	47,500	73,100	54,300	61,500	59,600	74,200	29,700	64,600	56,000	68,200	81,000	109,400	46,900
		Number Ad F		20,400	25,400	23,300	35,300	27,200	38,400	28,100	39,200	19,600	34,500	29,100	35,500	42,600	57,500	17,800
		Number Im M		42,200	31,300	47,500	48,500	76,500	81,900	65,300	43,200	71,900	66,700	57,500	65,400	67,500	62,800	75,200
		Number Im F		24,700	28,500	39,600	38,200	58,200	57,900	51,200	27,800	46,000	51,500	42,300	48,700	48,700	48,600	56,600
		Number Total		136,500	131,700	158,000	195,200	216,100	239,700	204,100	184,300	167,200	217,200	185,000	217,800	239,800	278,400	196,400
		Percent		68.2	69.0	63.1	71.2	72.2	65.0	65.8	57.5	55.6	67.2	65.2	75.9	72.3	77.8	74.1
		Im:Ad		1.0	0.8	1.2	0.8	1.7	1.4	1.3	0.6	2.4	1.2	1.2	1.1	0.9	0.7	2.0
		M:F (Ad)		2.4	1.8	2.0	2.1	2.0	1.6	2.1	1.9	1.5	1.9	1.9	1.9	1.9	1.9	2.6
		M:F (Im)		1.7	1.1	1.2	1.3	1.3	1.4	1.3	1.6	1.6	1.3	1.4	1.3	1.4	1.3	1.3
	Combined	Number Ad M		63,700	54,600	59,300	86,800	66,200	74,200	71,900	96,900	42,500	85,200	70,100	87,400	98,300	123,900	64,800
		Number Ad F		34,900	32,700	32,800	46,800	34,200	48,200	36,600	55,700	27,200	52,800	40,200	48,100	58,100	67,300	29,900
		Number Im M		66,300	45,700	73,500	70,100	108,200	100,700	100,300	68,100	97,900	95,200	82,600	92,200	90,300	87,500	112,400
		Number Im F		46,200	43,900	63,100	58,900	89,500	78,200	86,700	45,000	76,500	77,500	66,600	71,100	69,900	72,200	95,500
		Number Total	207,200	211,000	176,900	228,600	262,600	298,200	301,200	295,500	265,700	244,100	310,700	259,500	298,800	316,700	350,900	302,700
		Percent	51.7	51.9	46.9	49.1	59.3	58.1	56.0	56.3	48.5	46.9	53.9	52.8	60.9	58.5	63.7	62.6
		Im:Ad		1.1	1.0	1.5	1.0	2.0	1.5	1.7	0.7	2.5	1.3	1.4	1.2	1.0	0.8	2.2
		M:F (Ad)		1.8	1.7	1.8	1.9	1.9	1.5	2.0	1.7	1.6	1.6	1.7	1.8	1.7	1.8	2.2
		M:F (Im)		1.4	1.0	1.2	1.2	1.2	1.3	1.2	1.5	1.3	1.2	1.2	1.3	1.3	1.2	1.2
Oregon	1	Number Ad M		9,000	12,300	6,500	8,300	8,200	13,600	12,400	13,900	14,800	25,500	12,500	13,000	26,300	17,600	11,300
		Number Ad F		9,400	7,600	5,700	4,900	5,400	9,900	11,600	8,500	11,000	18,000	9,200	11,900	13,200	13,000	9,200
		Number Im M		16,500	14,900	13,900	16,000	16,800	18,900	26,800	20,200	30,300	32,500	20,700	16,300	27,700	28,700	17,200
		Number Im F		17,000	11,200	16,600	17,100	16,000	20,300	29,600	16,200	33,600	30,600	20,800	21,900	21,300	26,300	25,000
		Number Total		51,800	46,000	42,700	46,400	46,400	62,700	80,400	58,800	89,700	106,600	63,100	63,100	88,400	85,600	62,700
		Percent		43.4	35.2	27.1	35.8	30.4	29.6	37.0	27.6	36.8	41.0	34.4	31.0	39.9	42.1	40.8
		Im:Ad		1.8	1.3	2.5	2.5	2.4	1.7	2.3	1.6	2.5	1.5	1.9	1.5	1.2	1.8	2.1
		M:F (Ad)		1.0	1.6	1.1	1.7	1.5	1.4	1.1	1.6	1.4	1.4	1.4	1.1	2.0	1.3	1.2
		M:F (Im)		1.0	1.3	0.8	0.9	1.0	0.9	0.9	1.2	0.9	1.1	1.0	0.7	1.3	1.1	0.7
	2	Number Ad M		12,700	7,600	8,900	9,500	5,100	9,900	13,900	18,100	8,300	11,900	10,600	10,300	27,000	14,100	9,600
		Number Ad F		5,200	4,200	3,400	4,700	3,100	5,600	5,100	9,600	3,900	7,000	5,200	5,500	9,400	6,800	5,700
		Number Im M		6,600	5,300	6,800	6,000	5,200	14,000	20,500	12,000	13,400	14,400	10,400	11,500	24,500	11,400	16,900
		Number Im F		5,000	9,100	9,400	4,900	5,700	12,000	10,000	8,200	5,800	9,800	8,000	11,800	12,200	4,900	15,100
		Number Total		29,500	26,100	28,600	25,200	19,100	41,500	49,500	47,900	31,400	43,100	34,200	39,200	73,100	37,300	47,300
		Percent		54.7	61.0	61.8	59.3	65.2	64.5	62.4	69.6	71.0	65.8	63.7	62.9	75.8	68.2	82.1
		Im:Ad		0.6	1.2	1.3	0.8	1.3	1.7	1.6	0.7	1.6	1.3	1.2	1.5	1.0	0.8	2.1
		M:F (Ad)		2.4	1.8	2.6	2.0	1.6	1.8	2.7	1.9	2.1	(1.7)	2.0	1.9	2.9	2.1	1.7
		M:F (Im)		(1.3)	0.6	0.7	1.2	0.9	1.2	2.1	1.5	2.3	1.5	1.3	1.0	2.0	2.3	1.1

← Not in survey →

	3	Number	Ad M		400	2,800	2,900	5,800	4,000	7,700	2,900	4,900	7,800	3,900	4,300	2,300	7,400	6,800	2,300
			Ad F		200	400	2,400	4,800	2,700	5,200	2,400	3,100	4,400	3,300	2,900	1,800	5,000	2,200	2,500
			Im M		1,500	8,900	6,600	8,000	13,300	7,500	9,300	6,500	13,700	7,300	8,300	11,600	5,100	11,700	9,800
			Im F		1,800	7,400	6,000	6,900	7,900	6,500	5,600	5,700	9,800	6,800	6,400	5,600	3,800	6,500	6,800
			Total		3,900	19,500	17,900	25,300	27,900	26,900	20,200	20,200	35,700	21,300	21,900	21,400	21,300	27,100	21,300
		Percent			14.7	32.1	35.6	42.0	42.5	31.1	33.9	32.9	30.6	22.0	32.0	20.1	25.3	30.2	30.7
		Im:Ad			(5.6)	5.2	2.4	1.4	3.1	1.1	2.8	1.5	1.9	2.0	2.0	4.2	0.7	2.0	3.5
		M:F (Ad)			(2.0)	(7.5)	1.2	1.2	1.5	1.5	(1.2)	(1.6)	1.8	(1.2)	1.5	(1.3)	(1.5)	(3.2)	(0.9)
		M:F (Im)			(0.8)	1.2	1.1	1.2	1.7	1.2	1.7	(1.1)	1.4	1.1	1.3	2.1	(1.3)	1.8	1.4
	Combined	Number	Ad M		22,000	22,600	18,300	23,600	17,300	31,200	29,200	36,900	30,900	41,300	27,300	25,700	60,700	38,500	23,200
			Ad F		14,700	12,200	11,600	14,300	11,200	20,600	19,200	21,200	19,200	28,400	17,300	19,200	27,500	22,000	17,400
			Im M		24,500	29,100	27,300	30,000	35,300	40,400	56,600	38,700	57,500	54,200	39,400	39,400	57,300	51,800	43,800
			Im F		23,800	27,700	32,000	28,900	29,500	38,900	45,100	30,200	49,200	47,200	35,300	39,400	37,300	37,700	46,900
			Total	100,800	85,100	91,600	89,200	96,900	93,400	131,200	150,100	126,900	156,800	171,100	119,200	123,700	182,800	150,000	131,300
		Percent		42.9	42.7	39.1	35.1	41.7	37.7	36.1	42.1	37.0	38.8	40.5	39.0	33.2	45.5	43.1	46.8
		Im:Ad			1.3	1.6	2.0	1.6	2.3	1.5	2.1	1.2	2.1	1.5	1.7	1.8	1.1	1.5	2.2
		M:F (Ad)			1.5	1.9	1.6	1.6	1.5	1.5	1.5	1.7	1.6	1.5	1.6	1.3	2.2	1.7	1.3
		M:F (Im)			1.0	1.1	0.9	1.0	1.2	1.0	1.3	1.3	1.2	1.1	1.1	1.0	1.5	1.4	0.9
Idaho	1	Number	Ad M		40,500	33,900	44,800	66,400	36,100	49,700	52,200	48,700	50,800	46,100	46,900	50,600	82,800	56,500	52,700
			Ad F		14,000	11,700	18,700	26,500	13,400	21,800	22,000	19,600	19,600	15,900	18,300	25,700	32,000	29,400	22,500
			Im M		26,800	25,400	37,900	38,900	34,800	46,700	51,200	31,500	49,800	38,600	38,200	53,800	60,400	38,000	58,400
			Im F		17,900	21,000	28,400	33,300	27,500	33,300	44,900	24,900	34,200	27,500	29,300	38,000	43,100	35,700	41,200
			Total		99,100	92,000	129,800	165,100	111,800	151,400	170,400	124,700	154,300	128,200	132,700	168,100	218,300	159,600	174,900
		Percent			72.7	74.8	75.4	81.9	81.0	79.6	65.4	76.9	75.7	77.0	75.6	80.4	79.7	79.8	78.2
		Im:Ad			0.8	1.0	1.0	0.8	1.3	1.1	1.3	0.8	1.2	1.1	1.0	1.2	0.9	0.9	1.3
		M:F (Ad)			2.9	2.9	2.4	2.5	2.7	2.3	2.4	2.5	2.6	2.9	2.6	2.0	2.6	1.9	2.3
		M:F (Im)			1.5	1.2	1.3	1.2	1.3	1.4	1.1	1.3	1.5	1.4	1.3	1.4	1.4	1.1	1.4
	2	Number	Ad M		14,000	11,100	22,600	11,300	13,900	12,000	22,600	20,900	15,900	27,800	17,200	21,500	16,900	22,000	26,900
			Ad F		6,400	5,500	7,400	5,600	4,300	6,400	9,200	12,200	7,100	11,500	7,500	11,900	10,700	10,000	9,600
			Im M		12,000	6,600	14,600	10,700	12,200	14,600	20,100	14,300	16,000	23,900	14,500	28,900	14,100	14,600	27,400
			Im F		7,300	6,100	11,000	8,300	8,400	10,700	16,300	8,100	9,200	12,300	9,800	20,700	7,300	9,800	16,200
			Total		39,700	29,400	55,600	35,900	38,900	43,700	68,200	55,400	48,100	75,500	49,000	83,000	49,100	56,400	80,100
		Percent			68.4	75.0	77.8	73.6	77.2	77.8	79.1	75.8	65.9	66.9	73.3	77.5	72.4	81.9	74.4
		Im:Ad			0.9	0.8	0.9	1.1	1.1	1.4	1.1	0.7	1.1	0.9	1.0	1.5	0.8	0.8	1.2
		M:F (Ad)			2.2	2.0	3.1	2.0	3.2	1.9	2.5	1.7	2.3	2.4	2.3	1.8	1.6	2.2	2.8
		M:F (Im)			1.6	1.1	1.3	1.3	1.5	1.4	1.2	1.8	1.7	1.9	1.5	1.4	1.9	1.5	1.7
	Combined	Number	Ad M		54,400	45,000	67,400	77,700	50,100	61,700	74,900	69,600	66,700	73,900	64,100	72,100	99,700	78,500	79,600
			Ad F		20,400	17,200	26,000	32,000	17,700	28,100	31,200	31,700	26,600	27,400	25,800	37,600	42,700	39,400	32,100
			Im M		38,700	32,000	52,500	49,600	47,000	61,300	71,300	45,800	65,700	62,500	52,700	82,700	74,500	52,600	85,800
			Im F		25,200	27,100	39,400	41,600	35,900	44,000	61,200	33,000	43,400	39,900	39,100	58,700	50,500	45,500	57,400
			Total	121,900	138,800	121,400	185,400	201,000	150,700	195,100	238,600	180,100	202,400	203,600	181,700	251,100	267,400	216,000	254,900
		Percent		74.7	71.4	74.9	76.1	80.3	80.0	79.2	68.8	76.6	73.1	72.9	75.0	79.4	78.2	80.3	77.0
		Im:Ad			0.9	1.0	1.0	0.8	1.2	1.2	1.2	0.8	1.2	1.0	1.0	1.3	0.9	0.8	1.3
		M:F (Ad)			2.7	2.6	2.6	2.4	2.8	2.2	2.4	2.2	2.5	2.7	2.5	1.9	2.3	2.0	2.5
		M:F (Im)			1.5	1.2	1.3	1.2	1.3	1.4	1.2	1.4	1.5	1.6	1.3	1.4	1.5	1.2	1.5
Montana	1	Number	Ad M		14,700	7,900	9,100	11,400	9,700	10,800	13,200	9,900	9,200	13,600	10,900	11,900	10,600	10,000	6,200
			Ad F		5,900	4,300	4,100	5,500	4,700	7,600	7,500	4,200	4,800	12,100	6,100	4,600	4,500	4,500	3,600
			Im M		15,600	9,100	21,700	11,500	17,300	23,400	18,600	8,700	13,300	16,100	15,500	17,000	8,300	14,200	13,600
			Im F		8,100	6,100	14,100	7,300	9,800	15,800	10,100	5,600	11,300	11,100	9,900	11,600	4,800	10,100	10,000
			Total		44,400	27,400	49,100	35,600	41,500	57,600	49,300	28,300	38,700	52,900	42,500	45,200	28,300	38,800	33,400
		Percent			81.0	82.9	79.5	80.9	75.8	72.6	79.7	66.1	66.9	74.6	75.7	67.8	49.4	67.0	72.1
		Im:Ad			1.2	1.2	2.7	1.1	1.9	2.1	1.4	1.0	1.8	1.1	1.5	1.7	0.9	1.7	2.4
		M:F (Ad)			2.5	1.9	2.2	2.1	2.1	1.4	1.8	2.4	1.9	1.1	1.8	2.6	2.4	2.2	1.7
		M:F (Im)			1.9	1.5	1.5	1.6	1.8	1.5	1.8	1.6	1.2	1.4	1.6	1.5	1.7	1.4	1.4

a/ Data for 1960 are available only by State of duck stamp purchase; age and sex composition estimates were obtained only for the Mississippi and Atlantic Flyways that season.

b/ Estimates in parentheses based on information pertaining to fewer than 50 mallards (ratios) or 100 ducks (percentages).

Table A-11.--continued. Size, age, and sex characteristics of the annual mallard harvest by harvest area and State of harvest, 1960-1974. (All mallard bloodlines and all U. S. waterfowl seasons included; Ad = adult, Im = immature, M = male, F = female.)

State and Flyway	Harvest area	Parameter estimated	Hunting Season														
			1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1961-1970 Average	1971-72	1972-73	1973-74	1974-75
Pacific Flyway																		
Montana	2	Number: Ad M						13,300	18,300	18,900	9,200	20,700	15,300	15,900	13,200	19,000	9,900	6,000
		Number: Ad F						5,000	5,900	7,400	6,300	10,900	5,200	6,800	5,400	9,500	4,100	2,600
		Number: Im M						10,500	20,400	19,000	7,700	23,700	15,700	16,100	18,000	10,100	9,900	16,500
		Number: Im F						7,700	11,900	11,800	4,100	13,400	6,500	9,300	9,100	9,900	5,800	9,900
		Number: Total	← Area 2 in Central Flyway →					36,400	56,500	57,100	27,300	68,700	42,700	48,100	45,700	48,500	29,700	34,900
		Percent						75.2	69.3	70.5	50.4	68.8	73.3	68.2	81.9	62.0	76.6	63.3
		Im:Ad						1.0	1.3	1.2	0.8	1.2	1.1	1.1	1.5	0.7	1.1	3.1
		M:F (Ad)						2.7	3.1	2.6	1.5	1.9	2.9	2.4	2.4	2.0	2.4	2.3
		M:F (Im)						1.4	1.7	1.6	1.9	1.8	2.4	1.7	2.0	1.0	1.7	1.7
	Combined	Number: Ad M		14,700	7,900	9,100	11,400	23,000	29,100	32,100	19,000	29,900	28,900	20,500	25,000	29,600	19,900	12,200
		Number: Ad F		5,900	4,300	4,100	5,500	9,700	13,500	14,900	10,500	15,700	17,300	10,100	10,000	14,000	8,600	6,200
		Number: Im M	Entire	15,600	9,100	21,700	11,500	27,800	43,700	37,600	16,400	37,100	31,800	25,200	35,000	18,400	24,000	30,100
		Number: Im F	State	8,100	6,100	14,100	7,300	17,500	27,800	21,900	9,700	24,700	17,600	15,500	20,700	14,700	15,900	19,900
		Number: Total	in	44,400	27,400	49,100	35,600	77,900	114,100	106,400	55,500	107,300	95,600	71,400	90,900	76,700	68,500	68,300
		Percent	Central	81.0	82.9	79.5	80.9	75.5	70.9	74.5	57.3	68.1	74.0	72.5	74.2	56.7	70.9	67.3
		Im:Ad	Flyway	1.2	1.2	2.7	1.1	1.4	1.7	1.3	0.9	1.4	1.1	1.3	1.6	0.8	1.4	2.7
		M:F (Ad)		2.5	1.9	2.2	2.1	2.4	2.2	2.2	1.8	1.9	1.7	2.0	2.5	2.1	2.3	2.0
		M:F (Im)		1.9	1.5	1.5	1.6	1.6	1.6	1.7	1.7	1.5	1.8	1.6	1.7	1.2	1.5	1.5
Wyoming	1	Number: Ad M			2,400	2,300	2,300	1,300	2,200	1,500	2,600	1,300	1,700	2,000	1,500	2,100	2,700	1,600
		Number: Ad F			1,200	1,200	1,200	1,000	900	700	1,800	800	1,600	1,200	700	1,400	900	700
		Number: Im M			2,400	2,500	2,600	2,500	3,100	3,600	2,400	5,300	5,700	3,300	1,900	3,000	1,600	2,200
		Number: Im F			2,100	1,500	2,200	1,200	3,100	1,900	1,600	2,900	4,300	2,300	2,000	2,200	2,100	1,500
		Number: Total	Entire State in		8,100	7,500	8,200	6,000	9,300	7,700	8,400	10,300	13,400	8,800	6,100	8,600	7,400	6,100
		Percent	Central Flyway		91.4	80.5	85.9	78.6	84.4	86.8	77.2	73.6	83.3	82.0	72.0	77.3	73.2	57.5
		Im:Ad			1.2	1.2	1.4	1.6	2.0	2.5	0.9	3.9	3.0	1.8	1.8	1.5	1.0	1.5
		M:F (Ad)			2.0	2.0	1.9	1.3	2.3	2.0	1.4	(1.6)	(1.1)	1.7	(2.3)	1.6	(2.9)	2.3
		M:F (Im)			1.2	1.6	1.2	2.2	1.0	1.9	1.4	1.9	1.3	1.5	1.0	1.4	(0.8)	1.4
Calif.	1	Number: Ad M		3,500	6,900	12,000	10,100	10,900	7,000	11,300	6,900	10,000	8,500	8,700	8,600	7,000	8,000	8,700
		Number: Ad F		1,700	3,500	6,200	5,100	6,600	5,500	10,300	4,400	7,700	6,700	5,800	9,100	3,700	3,200	5,100
		Number: Im M		8,200	7,600	23,900	11,200	15,600	8,600	25,700	9,300	20,900	21,400	15,200	13,900	16,300	10,800	16,200
		Number: Im F		4,800	7,600	22,300	12,500	12,900	9,400	23,300	10,200	15,200	22,300	14,000	13,200	15,300	7,800	16,900
		Number: Total		18,200	25,600	64,400	38,900	46,000	30,500	70,600	30,900	53,800	58,800	43,800	44,800	42,200	29,800	46,800
		Percent		17.2	24.6	32.4	29.0	35.4	31.6	28.2	24.8	22.3	28.4	27.5	19.5	23.0	25.6	28.4
		Im:Ad		2.5	1.4	2.5	1.6	1.6	1.4	2.3	1.7	2.0	2.9	2.0	1.5	2.9	1.7	2.4
		M:F (Ad)		(2.1)	2.0	2.0	2.0	1.7	1.3	1.1	1.6	1.3	1.3	1.5	1.0	(1.9)	2.5	1.7
		M:F (Im)		1.7	1.0	1.1	0.9	1.2	0.9	1.1	0.9	1.4	1.0	1.1	1.1	1.1	1.4	1.0
	2	Number: Ad M		37,900	33,400	41,800	36,000	36,800	36,700	55,800	41,100	39,600	59,700	41,900	44,800	64,200	26,100	31,200
		Number: Ad F		17,800	13,200	19,100	16,400	19,300	23,000	25,600	18,500	16,200	24,900	19,400	24,500	29,600	15,000	19,000
		Number: Im M		49,200	34,200	50,700	46,800	77,700	67,500	85,200	54,300	79,700	80,100	62,500	62,700	76,500	38,800	51,000
		Number: Im F		31,400	28,700	43,200	42,200	53,400	48,200	87,000	39,400	67,000	70,200	51,100	65,900	63,300	40,200	53,000
		Number: Total		136,400	109,500	154,700	141,300	187,200	175,500	253,600	153,300	202,500	235,000	174,900	198,000	233,600	120,100	154,300
		Percent		22.9	21.6	19.7	22.4	23.4	20.6	20.3	22.7	17.8	16.4	20.2	18.3	19.8	17.0	16.1
		Im:Ad		1.4	1.4	1.5	1.7	2.3	1.9	2.1	1.6	2.6	1.8	1.9	1.9	1.5	1.9	2.1
		M:F (Ad)		2.1	2.5	2.2	2.2	1.9	1.6	2.2	2.2	2.5	2.4	2.2	1.8	2.2	1.7	1.6
		M:F (Im)		1.6	1.2	1.2	1.1	1.5	1.4	1.0	1.4	1.2	1.1	1.2	1.0	1.2	1.0	1.0
	3	Number: Ad M		13,900	4,400	6,600	11,300	9,000	12,500	21,000	10,800	9,800	14,400	11,400	15,300	11,800	18,700	16,200
		Number: Ad F		3,200	4,700	3,000	8,300	5,800	9,100	13,800	6,100	5,800	7,400	6,700	6,400	6,800	11,200	11,300
		Number: Im M		12,200	10,900	18,900	23,100	19,900	25,600	37,600	19,600	20,800	23,200	21,200	11,600	8,600	19,300	30,500
		Number: Im F		9,300	10,800	13,900	16,600	17,600	22,900	35,500	12,400	28,900	15,600	18,300	12,300	8,400	16,500	25,100
		Number: Total		38,500	30,800	42,400	59,300	52,200	70,000	108,000	48,900	65,300	60,600	57,600	45,600	35,500	65,700	83,200
		Percent		17.7	13.6	11.9	18.1	13.2	12.0	15.1	11.5	10.0	9.8	12.7	8.1	7.7	14.5	13.0
		Im:Ad		1.3	2.4	3.4	2.0	2.5	2.2	2.1	1.9	3.2	1.8	2.2	1.1	0.9	1.2	2.0
		M:F (Ad)		4.3	0.9	2.2	1.4	1.6	1.4	1.5	1.8	1.7	1.9	1.7	2.4	1.7	1.7	1.4
		M:F (Im)		1.3	1.0	1.4	1.4	1.1	1.1	1.1	1.6	0.7	1.5	1.2	0.9	1.0	1.2	1.2

	4	Number	Ad M		1,000	tr.	1,600	2,500	900	2,800	2,300	1,100	1,300	3,800	1,700	5,200	4,000	600	700
			Ad F		0	0	1,100	1,300	1,000	1,600	900	400	700	2,300	900	3,900	1,600	1,000	1,600
			Im M		1,200	1,100	1,200	2,900	4,500	3,300	4,000	1,500	4,200	6,800	3,100	8,400	1,900	1,800	3,900
			Im F		1,900	1,300	2,400	2,800	3,600	5,100	7,100	200	3,900	4,800	3,300	8,400	3,900	1,000	2,500
			Total		4,100	2,400	6,300	9,500	9,900	12,800	14,300	3,200	10,100	17,600	9,000	25,900	11,400	4,300	8,700
		Percent			3.2	1.9	5.2	6.1	7.4	6.0	5.8	2.9	5.6	9.1	5.6	12.8	6.8	2.5	5.3
		Im:Ad			(3.1)	(**)	1.4	1.5	(4.2)	1.9	3.5	(1.2)	4.2	1.9	2.4	1.9	(1.0)	(1.7)	(2.8)
		M:F (Ad)			(**) c/	(**)	(1.5)	(2.0)	(0.9)	(1.8)	(2.4)	(2.9)	(2.0)	(1.7)	1.9	(1.3)	(2.5)	(0.6)	(0.4)
		M:F (Im)			(0.6)	(0.9)	(0.5)	(1.0)	(1.3)	(0.7)	0.6	(7.3)	(1.1)	1.4	0.9	1.0	(0.5)	(1.8)	(1.5)
	Combined	Number	Ad M		56,300	44,700	62,000	59,900	57,600	59,100	90,400	59,900	60,800	86,300	63,700	74,000	87,000	53,400	56,900
			Ad F		22,800	21,400	29,300	31,100	32,700	39,200	50,700	29,400	30,300	41,200	32,800	43,900	41,700	30,300	37,100
			Im M		70,700	53,800	94,700	84,000	117,700	104,900	152,500	84,800	125,500	131,500	102,000	96,600	103,200	70,800	101,600
			Im F		47,400	48,400	81,800	74,100	87,400	85,500	152,900	62,200	115,100	112,900	86,800	99,800	90,800	65,400	97,500
			Total	220,800	197,200	168,300	267,800	249,000	295,400	288,800	446,500	236,200	331,700	371,900	285,300	314,200	322,700	220,000	293,000
		Percent		15.1	18.8	17.5	18.3	20.0	20.2	16.6	18.2	17.7	15.0	15.2	17.4	15.1	16.2	15.2	15.2
		Im:Ad			1.5	1.5	1.9	1.7	2.3	1.9	2.2	1.6	2.6	1.9	2.0	1.7	1.5	1.6	2.1
		M:F (Ad)			2.5	2.1	2.1	1.9	1.8	1.5	1.8	2.0	2.0	2.1	1.9	1.7	2.1	1.8	1.5
		M:F (Im)			1.5	1.1	1.2	1.1	1.3	1.2	1.0	1.4	1.1	1.2	1.2	1.0	1.1	1.1	1.0
Nevada	1	Number	Ad M		1,200	500	3,500	4,400	3,800	5,400	3,200	6,600	2,400	7,300	3,800	5,400	3,600	2,800	2,400
			Ad F		1,100	1,100	2,000	2,900	2,000	4,600	2,800	4,800	2,100	3,400	2,700	3,900	4,100	2,100	1,300
			Im M		2,200	1,300	6,300	8,000	6,700	6,600	7,200	8,300	8,000	12,200	6,700	9,600	6,700	5,800	3,600
			Im F		2,300	1,900	4,900	8,700	6,600	8,400	6,600	8,800	7,300	10,100	6,600	7,300	4,300	4,900	3,700
			Total		6,800	4,900	16,600	24,000	19,200	25,000	19,900	28,500	19,700	32,900	19,700	26,300	18,600	15,700	11,000
		Percent			39.4	32.1	37.7	38.7	33.3	31.3	22.8	36.4	22.7	32.9	31.4	30.4	25.9	25.4	23.5
		Im:Ad			2.0	(2.0)	2.1	2.3	2.3	1.5	2.3	1.5	3.5	2.1	2.0	1.8	1.4	2.1	2.0
		M:F (Ad)			(1.1)	(0.5)	1.8	1.5	1.9	1.2	1.1	1.4	1.2	2.2	1.4	1.4	0.9	1.3	(1.9)
		M:F (Im)			1.0	(0.7)	1.3	0.9	1.0	0.8	1.1	1.0	1.1	1.2	1.0	1.3	1.6	1.2	1.0
	2	Number	Ad M		400	800	1,200	800	400	1,700	2,000	1,100	500	800	1,000	2,700	1,600	2,200	1,800
			Ad F		400	700	400	700	500	1,700	1,100	2,400	700	1,200	1,000	1,800	1,600	900	2,000
			Im M		400	1,300	2,100	1,700	2,900	1,600	2,800	1,200	2,400	2,200	1,900	3,400	2,000	3,300	2,200
			Im F		900	1,700	1,900	1,400	2,000	1,900	4,400	1,300	2,100	2,400	2,000	1,800	1,300	1,900	2,500
			Total		2,100	4,500	5,600	4,700	5,900	6,900	10,300	5,900	5,700	6,600	5,800	9,800	6,500	8,300	8,500
		Percent			36.9	44.3	48.6	40.3	35.7	37.4	49.4	29.2	23.9	31.2	36.4	29.2	42.8	34.1	27.7
		Im:Ad			1.7	2.0	2.6	2.1	5.2	1.0	2.3	(0.7)	3.8	(2.4)	2.0	1.1	1.0	1.7	1.2
		M:F (Ad)			(1.1)	(1.2)	3.1	1.2	(0.8)	(1.0)	(1.9)	(0.5)	(0.6)	(0.6)	1.0	(1.5)	1.0	(2.4)	(0.9)
		M:F (Im)			(0.5)	0.8	1.1	1.2	1.4	(0.8)	0.6	(0.9)	(1.2)	(0.9)	1.9	(1.8)	1.6	1.7	(0.9)
	Combined	Number	Ad M		1,600	1,300	4,600	5,200	4,300	7,200	5,300	7,600	2,800	8,000	4,800	8,100	5,200	5,000	4,200
			Ad F		1,500	1,800	2,300	3,600	2,600	6,200	3,900	7,100	2,800	4,500	3,600	5,800	5,600	3,000	3,300
			Im M		2,700	2,700	8,400	9,700	9,600	8,200	10,000	9,500	10,400	14,400	8,600	12,900	8,700	9,100	5,800
			Im F		3,200	3,600	6,800	10,100	8,700	10,300	11,000	10,100	9,300	12,500	8,600	9,200	5,500	6,800	6,200
			Total	15,900	8,900	9,300	22,200	28,600	25,100	31,900	30,300	34,300	25,400	39,500	25,600	36,000	25,100	24,000	19,500
		Percent		44.9	38.7	37.0	39.9	39.0	33.9	32.5	27.9	34.9	22.9	32.6	32.4	30.1	28.8	27.9	25.1
		Im:Ad			1.9	2.0	2.2	2.3	2.7	1.4	2.3	1.3	3.5	2.1	2.0	1.6	1.3	2.0	1.6
		M:F (Ad)			1.1	0.7	2.0	1.5	1.7	1.1	1.3	1.1	1.0	1.8	1.3	1.4	0.9	1.6	1.3
		M:F (Im)			0.8	0.7	1.2	1.0	1.1	0.8	0.9	0.9	1.1	1.2	1.0	1.4	1.6	1.3	0.9
Utah	1	Number	Ad M		7,100	6,800	15,700	15,000	13,100	18,800	18,700	23,500	11,600	20,700	15,100	25,300	24,200	22,600	11,000
			Ad F		3,600	3,700	8,500	6,300	4,800	9,600	10,300	12,000	7,900	10,600	7,700	17,600	10,900	9,000	7,700
			Im M		12,500	10,200	22,300	17,200	23,600	19,100	23,000	21,500	19,100	32,000	20,000	32,000	25,700	25,600	17,300
			Im F		9,000	9,000	21,600	15,400	17,100	17,000	16,900	18,400	17,500	25,500	16,700	26,200	16,800	19,300	14,100
			Total		32,200	29,700	68,100	54,000	58,500	64,400	69,000	75,500	56,100	88,800	59,600	101,000	77,600	76,500	50,100
		Percent			28.1	27.5	31.7	34.6	23.5	24.4	23.3	28.0	24.2	31.0	27.2	31.0	35.2	24.0	20.0
		Im:Ad			2.0	1.8	1.8	1.5	2.3	1.3	1.4	1.1	1.9	1.8	1.6	1.4	1.2	1.4	1.7
		M:F (Ad)			2.0	1.8	1.8	2.4	2.7	2.0	1.8	2.0	1.5	2.0	2.0	1.4	2.2	2.5	1.4
		M:F (Im)			1.4	1.1	1.0	1.1	1.4	1.1	1.4	1.2	1.1	1.3	1.2	1.2	1.5	1.3	1.2
	2	Number	Ad M		500	300	1,400	700	1,300	1,300	3,600	1,700	1,700	1,600	1,400	1,900	1,500	1,500	2,500
			Ad F		600	300	700	700	400	1,100	2,400	1,700	1,300	1,600	1,100	900	1,200	700	1,500
			Im M		1,300	1,200	3,500	1,600	1,500	3,600	5,800	3,000	2,500	6,100	3,000	2,000	1,400	3,700	5,500
			Im F		600	1,300	2,800	1,200	2,500	3,600	4,900	3,000	3,400	4,600	2,800	1,100	800	3,000	4,200
			Total		3,000	3,100	8,400	4,300	5,900	9,600	16,700	9,400	8,900	13,900	8,300	5,900	4,900	8,900	13,800
		Percent			(54.9)	48.6	38.8	42.4	39.0	48.2	56.0	45.6	32.9	43.1	44.2	(45.2)	(54.2)	43.7	57.2
		Im:Ad			(1.7)	3.8	3.0	2.0	2.3	3.0	1.8	1.8	2.0	3.4	2.3	(1.1)	(0.8)	2.9	2.4
		M:F (Ad)			(0.9)	(1.1)	(2.1)	(0.9)	(3.0)	(1.1)	(1.5)	(1.0)	(1.3)	(1.0)	1.3	(2.0)	(1.2)	(2.1)	(1.7)
		M:F (Im)			(2.0)	0.9	1.2	1.3	(0.6)	(1.0)	1.2	1.0	(0.7)	1.3	1.1	(1.7)	(1.7)	(1.2)	1.3

c/ Ratios greater than 20.0 indicated by asterisks.

Table A-11.--continued. Size, age, and sex characteristics of the annual mallard harvest by harvest area and State of harvest, 1960-1974. (All mallard bloodlines and all U. S. waterfowl seasons included; Ad = adult, Im = immature, M = male, F = female.)

State and Flyway	Harvest area	Parameter estimated	Hunting Season 1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1961-1970 Average	1971-72	1972-73	1973-74	1974-75
Pacific Flyway																		
Utah	Combined	Number Ad M		7,600	7,100	17,100	15,700	14,400	20,100	22,300	25,200	13,300	22,300	16,500	27,200	25,700	24,100	13,500
		Number Ad F		4,200	4,000	9,200	7,100	5,300	10,800	12,800	13,800	9,300	12,200	8,800	18,500	12,100	9,700	9,200
		Number Im M		13,800	11,400	25,800	18,900	25,100	22,600	28,800	24,500	21,600	38,100	23,000	34,000	27,000	29,300	22,800
		Number Im F		9,700	10,300	24,400	16,600	19,600	20,600	21,800	21,400	20,800	30,100	19,500	27,300	17,700	22,300	18,300
		Number Total	76,200	35,200	32,800	76,500	58,300	64,400	74,000	85,600	84,900	65,000	102,700	67,900	107,000	82,500	85,400	63,900
		Percent	40.5	29.4	28.7	32.3	35.1	24.4	26.1	26.3	29.2	25.1	32.3	28.6	31.6	36.0	25.1	23.3
		Im:Ad		2.0	1.9	1.9	1.6	2.3	1.4	1.4	1.2	1.9	2.0	1.7	1.3	1.2	1.5	1.8
		M:F (Ad)		1.8	1.8	1.9	2.2	2.7	1.9	1.7	1.8	1.4	1.8	1.9	1.5	2.1	2.5	1.5
		M:F (Im)		1.4	1.1	1.1	1.1	1.3	1.1	1.3	1.1	1.0	1.3	1.2	1.2	1.5	1.3	1.2
Colorado	1	Number Ad M			3,800	4,500	5,600	4,200	5,300	6,600	3,800	4,200	3,100	4,600	4,200	6,100	5,700	4,600
		Number Ad F			1,200	1,700	3,000	2,200	2,400	3,200	2,500	2,200	2,400	2,300	3,800	3,000	4,000	3,300
		Number Im M			2,900	3,200	4,100	2,200	6,000	6,500	4,000	6,800	7,400	4,800	8,700	5,200	6,500	7,200
		Number Im F			1,300	2,600	3,800	2,700	4,900	5,700	3,000	3,900	4,600	3,600	5,900	3,300	5,200	4,800
		Number Total	Entire State in		9,300	12,000	16,400	11,300	18,600	22,000	13,300	17,100	17,600	15,300	22,700	17,600	21,400	20,000
		Percent	Central Flyway		94.5	87.7	80.9	84.0	79.1	76.8	79.1	86.8	81.5	82.1	70.5	64.8	87.6	70.8
		Im:Ad			0.8	0.9	0.9	0.8	1.4	1.2	1.1	1.7	2.2	1.2	1.8	0.9	1.2	1.5
		M:F (Ad)			3.1	2.6	1.9	1.9	2.2	2.1	1.5	2.0	1.3	2.0	1.1	2.0	1.4	1.4
		M:F (Im)			2.2	1.2	1.1	0.8	1.2	1.1	1.3	1.8	1.6	1.3	1.5	1.6	1.3	1.5
Arizona	1	Number Ad M		300	1,100	800	800	500	1,900	1,700	1,300	1,700	3,200	1,300	2,600	2,700	1,800	2,500
		Number Ad F		400	300	700	700	200	1,600	1,100	700	1,700	2,300	1,000	3,000	2,600	1,100	1,100
		Number Im M		800	1,200	1,300	1,800	1,600	3,200	3,700	1,900	3,700	2,000	2,100	4,300	3,600	2,500	2,700
		Number Im F		800	1,600	2,000	2,500	1,100	2,400	3,500	2,000	6,400	3,000	2,500	4,600	4,100	2,500	3,100
		Number Total	4,800	2,300	4,200	4,800	5,800	3,500	9,100	10,000	5,800	13,400	10,500	6,900	14,500	12,900	8,000	9,400
		Percent	18.8	11.8	21.7	17.9	14.1	10.3	18.8	14.3	12.1	16.5	13.7	14.9	14.8	13.1	19.3	11.0
		Im:Ad		(2.4)	2.1	2.2	2.9	3.8	1.6	2.6	1.9	3.0	0.9	2.0	1.6	1.5	1.7	1.6
		M:F (Ad)		(0.7)	(3.7)	(1.1)	(1.1)	(2.2)	1.2	(1.5)	(1.7)	(1.0)	1.4	1.3	0.9	(1.0)	(1.6)	(2.4)
		M:F (Im)		(1.0)	(0.7)	0.7	0.7	1.4	1.4	1.1	(1.0)	0.6	0.7	0.8	0.9	0.9	1.0	(0.9)
New Mexico	1	Number Ad M			500	600	400	1,500	600	400	400	300	500	600	300	1,300	600	500
		Number Ad F			300	500	400	1,500	700	200	200	100	400	500	300	0	500	300
		Number Im M			300	600	400	400	800	700	600	900	700	600	300	400	500	300
		Number Im F			100	1,300	400	1,900	400	700	500	900	800	800	300	400	600	600
		Number Total	Entire State in		1,100	3,000	1,600	5,300	2,500	1,900	1,700	2,200	2,400	2,400	1,200	2,100	2,100	1,600
		Percent	Central Flyway		(78.9)	53.3	57.6	(63.6)	53.4	37.7	32.4	(62.2)	(38.6)	50.6	(17.7)	(27.8)	42.9	23.4
		Im:Ad			(0.5)	1.8	1.0	(0.8)	0.9	(2.4)	(1.9)	(4.4)	(1.7)	1.3	(1.1)	(0.6)	1.0	1.0
		M:F (Ad)			(1.7)	(1.3)	(1.0)	(1.0)	(0.8)	(2.1)	(1.8)	(2.1)	(1.1)	1.2	(0.8)	(**)	(1.2)	(2.1)
		M:F (Im)			(4.0)	0.5	(0.8)	(0.2)	(2.1)	(1.1)	(1.1)	(1.0)	(1.0)	0.8	(1.2)	(1.2)	(0.8)	(0.5)
Central Flyway																		
Montana	2	Number Ad M		5,000	300	2,700	6,500							3,600				
		Number Ad F		2,400	100	1,000	2,700							1,500				
		Number Im M		4,300	800	2,300	3,700							2,700				
		Number Im F		2,700	500	1,800	3,200							2,000				
		Number Total		14,300	1,700	7,800	16,000	← Area 2 in Central Flyway →						9,900	← Area 2 in Central Flyway →			
		Percent		68.6	61.2	74.1	66.4							68.3				
		Im:Ad		0.9	3.1	1.1	0.7							0.9				
		M:F (Ad)		2.1	(3.5)	2.8	2.5							2.4				
		M:F (Im)		1.6	1.8	1.2	1.2							1.3				
	3	Number Ad M		4,500	600	4,000	2,900	2,400	6,600	6,000	13,000	15,600	23,500	7,900	22,600	19,800	11,600	8,900
		Number Ad F		1,900	200	1,800	1,800	1,200	3,000	2,500	1,400	3,900	3,900	2,200	4,100	3,200	1,700	2,200
		Number Im M		6,200	600	4,500	2,000	2,500	5,900	4,500	4,200	11,000	12,000	5,300	20,100	10,200	6,600	8,000
		Number Im F		3,400	800	1,600	1,900	1,900	4,600	3,200	1,100	3,500	3,100	2,500	5,000	3,500	2,200	2,800
		Number Total		16,000	2,200	11,900	8,700	8,100	20,100	16,200	19,700	34,000	42,700	17,900	51,800	36,600	22,200	22,000
		Percent		73.0	(73.0)	(88.0)	68.3	51.7	75.0	73.7	85.8	77.7	85.1	77.2	91.9	84.3	74.5	66.4
		Im:Ad		1.5	(1.6)	1.0	0.8	1.2	1.1	0.9	0.4	0.7	0.6	0.8	0.9	0.6	0.7	1.0
		M:F (Ad)		2.3	(2.8)	(2.2)	1.6	(2.0)	2.2	2.4	9.3	4.0	6.0	3.6	5.5	6.2	6.7	4.1
		M:F (Im)		1.9	(0.8)	(2.8)	1.1	1.4	1.3	1.4	3.6	3.1	3.8	2.1	4.0	3.0	3.0	2.8

	Combined	Ad M		9,500	900	6,700	9,500	2,400	6,600	6,000	13,000	15,600	23,500	9,400	22,600	19,800	11,600	8,900
		Ad F		4,300	300	2,800	4,500	1,200	3,000	2,500	1,400	3,900	3,900	2,800	4,100	3,200	1,700	2,200
		Im M		10,500	1,400	6,700	5,700	2,500	5,900	4,500	4,200	11,000	12,000	6,400	20,100	10,200	6,600	8,000
		Im F		6,100	1,200	3,400	5,100	1,900	4,600	3,200	1,100	3,500	3,100	3,300	5,000	3,500	2,200	2,800
		Total	58,500	30,300	3,900	19,700	24,700	8,100	20,100	16,200	19,700	34,000	42,700	21,900	51,800	36,600	22,200	22,000
		Percent	72.1	70.9	67.4	81.9	67.1	51.7	75.0	73.7	85.8	77.7	85.1	75.4	91.9	84.3	74.5	66.4
		Im:Ad		1.2	2.1	1.1	0.8	1.2	1.1	0.9	0.4	0.7	0.6	0.8	0.9	0.6	0.7	1.0
		M:F (Ad)		2.2	(3.0)	2.4	2.1	(2.0)	2.2	2.4	9.3	4.0	6.0	3.4	5.5	6.2	6.7	4.1
		M:F (Im)		1.7	1.1	2.0	1.1	1.4	1.3	1.4	3.6	3.1	3.8	1.9	4.0	3.0	3.0	2.8
North Dakota	1	Ad M		2,600	3,700	5,900	4,900	5,000	7,600	4,800	8,600	9,300	10,400	6,300	13,800	26,700	8,000	11,000
		Ad F		1,000	1,100	2,800	1,700	1,200	4,200	2,200	4,200	3,100	3,900	2,500	5,400	11,700	4,700	5,400
		Im M		2,600	3,300	6,700	4,800	4,200	9,500	9,000	6,300	17,100	13,900	7,700	15,100	18,700	8,100	9,300
		Im F		1,800	2,200	3,500	3,200	1,900	5,100	6,000	4,000	9,900	6,400	4,400	6,900	9,300	3,800	9,600
		Total		7,900	10,300	19,000	14,600	12,400	26,500	21,900	23,200	39,300	34,600	21,000	41,200	66,400	24,500	35,300
		Percent		(70.1)	59.8	58.8	69.7	52.3	49.1	44.8	55.7	43.0	62.3	52.8	61.4	65.3	72.9	55.5
		Im:Ad		1.2	1.2	1.2	1.2	1.0	1.2	2.2	0.8	2.2	1.4	1.4	1.2	0.7	0.9	1.2
		M:F (Ad)		(2.6)	3.4	2.1	2.9	(4.0)	1.8	2.2	2.0	3.0	2.7	2.5	2.6	2.3	1.7	2.0
		M:F (Im)		(1.5)	1.5	1.9	1.5	(2.2)	1.9	1.5	1.6	1.7	2.2	1.8	2.2	2.0	2.1	1.0
	2	Ad M		13,200	11,700	19,200	22,800	14,800	19,100	24,100	24,800	23,000	37,500	21,000	48,900	55,900	24,900	28,900
		Ad F		5,900	4,800	7,900	11,100	6,900	8,500	9,200	11,900	11,300	18,700	9,600	23,200	18,500	11,000	14,300
		Im M		11,600	11,800	16,400	15,000	15,500	27,700	29,100	12,700	28,000	32,100	20,000	37,800	43,300	22,100	33,900
		Im F		6,000	7,400	10,000	8,800	12,900	19,800	15,800	7,600	21,500	23,200	13,300	22,300	26,800	16,400	22,800
		Total		36,700	35,600	53,400	57,600	50,100	75,000	78,300	57,000	83,700	111,500	63,900	132,200	144,400	74,400	100,000
		Percent		75.0	65.0	51.4	53.4	39.0	47.4	46.3	43.5	40.5	52.4	48.3	54.4	63.6	51.4	51.5
		Im:Ad		0.9	1.2	1.0	0.7	1.3	1.7	1.3	0.6	1.4	1.0	1.1	0.8	0.9	1.1	1.3
		M:F (Ad)		2.2	2.4	2.4	2.1	2.2	2.2	2.6	2.1	2.0	2.0	2.2	2.1	3.0	2.3	2.0
		M:F (Im)		1.9	1.6	1.6	1.7	1.2	1.4	1.8	1.7	1.3	1.4	1.5	1.7	1.6	1.3	1.5
	3	Ad M		2,100	4,000	3,500	14,100	7,500	15,900	17,100	5,800	8,600	13,400	9,200	25,300	15,300	7,000	20,900
		Ad F		4,300	1,300	3,400	7,600	3,500	11,700	8,400	3,400	4,800	7,600	5,600	10,200	6,700	3,000	4,100
		Im M		4,000	4,300	6,900	13,400	10,500	22,500	20,500	5,200	17,300	20,200	12,500	15,600	16,100	7,600	20,000
		Im F		2,500	3,300	5,100	7,900	7,800	14,900	14,200	3,700	9,100	15,600	8,400	13,500	11,400	4,400	12,200
		Total		12,900	12,900	18,900	43,000	29,200	65,000	60,100	18,100	39,800	56,800	35,700	64,500	49,500	22,000	57,200
		Percent		74.0	62.7	56.3	52.2	51.4	43.9	41.6	47.1	35.7	47.0	46.1	47.8	56.8	43.4	54.9
		Im:Ad		1.0	1.4	1.8	1.0	1.7	1.3	1.4	1.0	2.0	1.7	1.4	0.8	1.3	1.2	1.3
		M:F (Ad)		0.5	3.0	1.0	1.8	2.2	1.4	2.0	1.7	1.8	1.8	1.6	2.5	2.3	2.3	5.1
		M:F (Im)		1.6	1.3	1.4	1.7	1.3	1.5	1.4	1.4	1.9	1.3	1.5	1.2	1.4	1.7	1.6
	Combined	Ad M		17,900	19,300	28,600	41,700	27,300	42,600	45,900	39,200	40,800	61,200	36,500	88,000	97,900	40,000	60,800
		Ad F		11,200	7,200	14,100	20,400	11,600	24,500	19,800	19,500	19,100	30,200	17,800	38,800	36,900	18,700	23,800
		Im M		18,100	19,400	30,000	33,100	30,200	59,700	58,600	24,200	62,400	66,200	40,200	68,500	78,100	37,800	63,200
		Im F		10,300	12,900	18,600	20,000	22,600	39,700	36,000	15,300	40,500	45,300	26,100	42,600	47,400	24,500	44,600
		Total	129,300	57,500	58,800	91,300	115,200	91,700	166,500	160,300	98,300	162,800	202,900	120,500	237,900	260,200	120,900	192,500
		Percent	67.9	74.1	63.5	53.8	54.5	43.9	46.2	44.3	46.6	39.8	52.1	48.4	53.5	62.6	52.8	53.2
		Im:Ad		1.0	1.2	1.1	0.9	1.4	1.5	1.4	0.7	1.7	1.2	1.2	0.9	0.9	1.1	1.3
		M:F (Ad)		1.6	2.7	2.0	2.0	2.4	1.7	2.3	2.0	2.1	2.0	2.1	2.3	2.7	2.1	2.6
		M:F (Im)		1.8	1.5	1.6	1.7	1.3	1.5	1.6	1.6	1.5	1.5	1.5	1.6	1.6	1.5	1.4
South Dakota	1	Ad M		6,100	1,500	3,100	5,000	4,200	12,400	11,900	3,900	5,800	13,100	6,700	6,900	13,700	12,400	4,000
		Ad F		2,000	700	1,000	2,700	2,200	3,600	3,200	2,800	900	3,600	2,300	2,400	3,600	2,600	700
		Im M		3,000	1,400	4,700	5,200	2,400	8,200	11,600	2,600	4,700	7,200	5,100	7,200	7,000	10,100	5,800
		Im F		100	300	2,600	3,500	1,400	2,900	7,100	900	1,200	3,100	2,300	2,100	4,700	5,800	900
		Total		11,200	3,900	11,500	16,400	10,200	27,100	33,900	10,200	12,600	27,100	16,400	18,600	29,000	30,900	11,300
		Percent		(80.9)	(77.2)	67.6	80.9	52.8	56.3	56.4	75.7	64.6	83.2	65.8	(64.9)	68.0	83.8	75.0
		Im:Ad		(0.4)	(0.8)	1.8	1.1	0.6	0.7	1.2	0.5	0.9	0.6	0.8	1.0	0.7	1.1	1.4
		M:F (Ad)		(3.0)	(2.0)	3.1	1.8	(1.9)	3.5	(3.7)	1.4	6.8	3.6	2.9	(2.9)	3.8	4.7	(5.5)
		M:F (Im)		(**)	(4.1)	1.8	1.5	(1.6)	(2.8)	1.6	(3.0)	3.9	2.3	2.2	(3.5)	1.5	1.7	(6.7)
	2	Ad M		22,900	12,700	27,500	30,400	15,600	33,800	35,600	22,300	23,800	39,000	26,400	66,200	55,200	45,600	9,200
		Ad F		13,000	5,900	11,200	14,800	6,900	15,600	18,200	12,400	12,300	13,200	12,300	19,400	21,100	24,100	4,800
		Im M		10,900	10,500	26,300	17,300	12,100	25,200	36,200	17,000	37,000	37,600	23,000	58,200	45,900	55,200	23,900
		Im F		7,600	8,000	16,600	10,300	7,700	22,100	26,000	8,800	24,400	19,800	15,100	31,800	25,700	25,300	15,300
		Total		54,400	37,100	81,600	72,700	42,400	96,600	115,900	60,400	97,500	109,700	76,800	175,600	147,900	150,200	53,200
		Percent		72.2	50.4	41.2	49.7	24.6	36.1	46.1	55.6	39.1	49.8	43.6	51.1	51.9	56.1	40.7
		Im:Ad		0.5	1.0	1.1	0.6	0.9	1.0	1.2	0.7	1.7	1.1	1.0	1.1	0.9	1.2	2.8
		M:F (Ad)		1.8	2.2	2.5	2.1	2.3	2.2	2.0	1.8	1.9	3.0	2.1	3.4	2.6	1.9	1.9
		M:F (Im)		(1.4)	1.3	1.6	1.7	1.6	1.1	1.4	1.9	1.5	1.9	1.5	1.8	1.8	2.2	1.6

Table A-11.--continued. Size, age, and sex characteristics of the annual mallard harvest by harvest area and State of harvest, 1960-1974. (All mallard bloodlines and all U. S. waterfowl seasons included; Ad = adult, Im = immature, M = male, F = female.)

State and Flyway	Harvest area	Parameter estimated	Hunting Season 1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1961-1970 Average	1971-72	1972-73	1973-74	1974-75
Central Flyway																		
South Dakota	Combined	Number Ad M		29,100	14,200	30,600	35,400	19,800	46,200	47,500	26,200	29,600	52,100	33,100	73,200	68,900	58,000	13,200
		Number Ad F		15,000	6,600	12,200	17,500	9,100	19,100	21,400	15,200	13,200	16,800	14,600	21,800	24,800	26,700	5,500
		Number Im M		13,900	11,900	31,000	22,500	14,500	33,400	47,700	19,600	41,700	44,900	28,100	65,300	52,900	65,300	29,700
		Number Im F		7,600	8,300	19,300	13,800	9,200	25,000	33,100	9,700	25,600	22,900	17,400	33,900	30,400	31,100	16,200
		Number Total	122,700	65,600	41,000	93,100	89,200	52,600	123,700	149,700	70,600	110,200	136,800	93,200	194,200	176,900	181,100	64,600
		Percent	55.0	73.6	52.1	43.3	53.5	27.5	39.2	48.1	57.8	41.0	54.1	46.3	52.1	54.0	59.4	44.3
		Im:Ad		0.5	1.0	1.2	0.7	0.8	0.9	1.2	0.7	1.6	1.0	1.0	1.0	0.9	1.1	2.5
		M:F (Ad)		1.9	2.2	2.5	2.0	2.2	2.4	2.2	1.7	2.2	3.1	2.3	3.4	2.8	2.2	2.4
		M:F (Im)		1.8	1.4	1.6	1.6	1.6	1.3	1.4	2.0	1.6	2.0	1.6	1.9	1.7	2.1	1.8
Wyoming	1	Number Ad M		900										900				
		Number Ad F		0										0				
		Number Im M		1,100										1,100				
		Number Im F		800										800				
		Number Total		2,900	← Area 1 in Pacific Flyway →									2,900	← Area 1 in Pacific Flyway →			
		Percent		(100.0)										(100.0)				
		Im:Ad		(2.2)										(2.2)				
		M:F (Ad)		(**)										(**)				
		M:F (Im)		(1.4)										(1.4)				
	2	Number Ad M		5,000	1,000	2,800	4,900	100	3,800	4,600	10,100	8,300	12,900	5,300	12,500	14,300	11,000	7,200
		Number Ad F		1,000	300	800	2,400	100	2,000	1,600	1,000	2,000	2,500	1,400	2,300	2,800	3,600	1,900
		Number Im M		4,200	1,000	1,800	3,200	200	2,900	4,100	5,900	5,800	6,300	3,500	10,900	6,200	7,000	6,100
		Number Im F		2,000	500	1,000	1,900	300	1,600	2,000	1,300	900	3,400	1,500	3,300	2,100	3,200	3,000
		Number Total		12,200	2,900	6,500	12,400	700	10,300	12,300	18,300	17,000	25,000	11,800	29,000	25,300	24,800	18,200
		Percent		69.9	79.5	73.9	66.2	15.3	46.8	52.2	79.7	66.6	69.3	64.1	68.3	69.7	70.2	71.3
		Im:Ad		1.0	1.2	0.8	0.7	(3.4)	0.8	1.0	0.6	0.7	0.6	0.8	1.0	0.5	0.7	1.0
		M:F (Ad)		(4.9)	(2.1)	3.3	2.1	(0.7)	1.9	2.8	9.7	4.2	5.2	3.9	5.4	5.2	3.0	3.8
		M:F (Im)		(2.1)	(2.0)	1.8	1.7	(0.7)	1.8	2.0	4.4	6.7	1.9	2.4	3.3	3.0	2.2	2.1
	Combined	Number Ad M		5,900	1,000	2,800	4,900	100	3,800	4,600	10,100	8,300	12,900	5,400	12,500	14,300	11,000	7,200
		Number Ad F		1,000	300	800	2,400	100	2,000	1,600	1,000	2,000	2,500	1,400	2,300	2,800	3,600	1,900
		Number Im M		5,400	1,000	1,800	3,200	200	2,900	4,100	5,900	5,800	6,300	3,700	10,900	6,200	7,000	6,100
		Number Im F		2,800	500	1,000	1,900	300	1,600	2,000	1,300	900	3,400	1,600	3,300	2,100	3,200	3,000
		Number Total	20,300	15,100	2,900	6,500	12,400	700	10,300	12,300	18,300	17,000	25,000	12,100	29,000	25,300	24,800	18,200
		Percent	72.9	74.1	79.5	73.9	66.2	15.3	46.8	52.2	79.7	66.6	69.3	64.6	68.3	69.7	70.2	71.3
		Im:Ad		1.2	1.2	0.8	0.7	(3.4)	0.8	1.0	0.6	0.7	0.6	0.8	1.0	0.5	0.7	1.0
		M:F (Ad)		(5.8)	(3.1)	3.3	2.1	(0.7)	1.9	2.8	9.7	4.2	5.2	3.9	5.4	5.2	3.0	3.8
		M:F (Im)		1.9	(2.0)	1.8	1.7	(0.7)	1.8	2.0	4.4	6.7	1.9	2.3	3.3	3.0	2.2	2.1
Nebraska	1	Number Ad M		17,500	4,900	10,700	18,800	7,400	12,100	13,300	16,400	49,200	41,900	19,200	19,000	30,700	20,400	10,800
		Number Ad F		5,200	900	4,300	7,400	2,600	4,000	4,100	6,800	6,100	7,400	4,900	3,400	6,100	4,700	2,000
		Number Im M		6,200	1,400	6,700	6,200	2,700	5,300	6,700	4,600	17,900	11,200	6,900	15,200	12,400	17,200	6,200
		Number Im F		2,200	800	4,800	3,400	1,700	3,800	4,400	3,500	6,700	5,500	3,700	5,500	3,700	6,400	2,000
		Number Total		31,000	8,000	26,600	35,900	14,500	25,200	28,500	31,300	79,900	65,900	34,700	43,100	52,900	48,700	21,000
		Percent		88.6	59.9	72.2	69.4	47.0	63.3	61.2	81.2	66.4	63.6	67.1	52.7	70.9	60.8	53.0
		Im:Ad		0.4	0.4	0.8	0.4	0.4	0.6	0.6	0.4	0.4	0.3	0.4	0.9	0.4	0.9	0.6
		M:F (Ad)		3.3	5.2	2.5	2.5	2.8	3.0	3.3	2.4	8.1	5.7	3.9	5.5	5.0	4.4	5.4
		M:F (Im)		2.8	(1.7)	1.4	1.8	(1.6)	1.4	1.5	1.3	2.7	2.0	1.9	2.8	3.4	2.7	3.1
	2	Number Ad M		16,900	3,000	7,200	12,000	8,800	17,800	33,600	18,400	14,600	43,700	17,600	35,400	37,100	20,700	9,600
		Number Ad F		5,600	700	2,900	4,500	1,400	6,500	9,400	4,600	3,200	5,300	4,400	6,900	8,000	4,800	1,400
		Number Im M		8,700	2,100	5,200	6,300	6,200	12,600	17,400	6,400	11,200	17,100	9,300	26,100	13,100	13,600	9,400
		Number Im F		3,600	1,200	3,500	4,100	2,800	5,600	9,700	4,300	4,400	6,300	4,600	7,100	4,100	6,900	4,300
		Number Total		34,900	6,900	18,800	26,900	19,200	42,500	70,100	33,600	33,300	72,400	35,900	75,400	62,300	46,000	24,700
		Percent		84.4	60.8	43.6	50.2	39.3	55.1	53.7	51.8	43.4	57.8	53.3	62.3	52.8	40.6	60.8
		Im:Ad		0.6	0.9	0.9	0.6	0.9	0.7	0.6	0.5	0.9	0.5	0.6	0.8	0.4	0.8	1.3
		M:F (Ad)		3.0	(4.3)	2.5	2.7	6.1	2.7	3.6	4.0	4.6	8.2	4.0	5.2	4.6	4.4	6.9
		M:F (Im)		2.4	(1.8)	1.5	1.6	2.2	2.2	1.8	1.5	2.5	2.7	2.0	3.7	3.2	2.0	2.2

	3	Number	Ad M		15,100	1,900	2,800	5,700	3,000	14,200	25,100	7,500	16,100	25,400	11,700	26,100	24,300	22,500	6,200
			Ad F		3,400	500	1,000	1,200	1,400	4,700	8,400	2,200	5,200	5,200	3,300	5,200	5,200	5,000	1,600
			Im M		6,000	900	2,400	3,300	2,400	10,000	14,300	3,400	14,000	16,800	7,400	24,400	21,200	17,100	7,700
			Im F		3,100	300	1,200	1,500	2,600	6,000	6,700	2,100	7,500	5,700	3,700	7,700	7,000	7,300	5,000
			Total		27,600	3,600	7,400	11,700	9,400	34,900	54,500	15,200	42,800	53,100	26,000	63,400	57,600	51,900	20,500
		Percent			80.4	43.5	33.6	34.2	42.0	50.2	47.2	40.2	44.2	47.9	47.2	63.8	60.9	48.4	54.5
		Im:Ad			0.5	(0.5)	1.0	0.7	1.1	0.8	0.6	0.6	1.0	0.7	0.7	1.0	1.0	0.9	1.6
		M:F (Ad)			4.5	(3.6)	2.9	4.8	(2.1)	3.0	3.0	3.5	3.1	4.9	3.5	5.1	4.7	4.5	4.0
		M:F (Im)			1.9	(3.4)	1.9	(2.2)	0.9	1.7	2.1	1.7	1.9	3.0	2.0	3.2	3.0	2.3	1.5
	Combined	Number	Ad M		49,400	9,800	20,700	36,500	19,200	44,100	72,000	42,200	79,800	110,900	48,500	80,500	92,100	63,700	26,600
			Ad F		14,200	2,200	8,200	13,100	5,500	15,300	21,900	13,600	14,500	17,900	12,600	15,500	19,200	14,400	4,900
			Im M		20,900	4,400	14,300	15,900	11,200	27,800	38,400	14,400	43,100	45,200	23,600	65,700	46,700	47,900	23,300
			Im F		8,900	2,300	9,600	9,000	7,100	15,500	20,800	9,900	18,700	17,400	11,900	20,200	14,700	20,600	11,300
			Total	90,500	93,500	18,500	52,900	74,500	43,100	102,600	153,100	80,200	156,000	191,500	96,600	181,900	172,800	146,600	66,200
		Percent		57.6	84.5	56.0	51.8	53.4	42.2	55.0	52.3	56.7	53.1	56.4	55.5	60.2	60.2	48.8	56.2
		Im:ad			0.5	0.6	0.8	0.5	0.7	0.7	0.6	0.4	0.7	0.5	0.6	0.9	0.6	0.9	1.1
		M:F (Ad)			3.5	4.5	2.5	2.8	3.5	2.9	3.3	3.1	5.5	6.2	3.8	5.2	4.8	4.4	5.4
		M:F (Im)			2.3	1.9	1.5	1.8	1.6	1.8	1.8	1.5	2.3	2.6	2.0	3.3	3.2	2.3	2.1
Colorado	1	Number	Ad M		6,000										6,000				
			Ad F		1,700										1,700				
			Im M		1,600										1,600				
			Im F		800										800				
			Total		10,200	← Area 1 in Pacific Flyway →									10,200	← Area 1 in Pacific Flyway →			
		Percent			86.9										86.9				
		Im:Ad			0.3										0.3				
		M:F (Ad)			3.5										3.5				
		M:F (Im)			(2.0)										(2.0)				
	2	Number	Ad M		1,400	200	5,100	3,500	2,700	3,700	5,600	4,100	8,700	8,000	4,300	10,200	4,100	3,700	3,100
			Ad F		1,000	100	3,800	2,400	1,100	1,800	2,300	1,400	1,700	2,200	1,800	3,100	1,200	1,400	1,700
			Im M		1,400	400	3,600	4,500	6,000	6,900	4,600	5,500	7,800	8,000	4,900	5,900	3,200	3,200	3,600
			Im F		600	400	2,400	2,300	5,600	5,600	3,100	1,800	2,700	2,800	2,700	2,100	900	1,300	2,100
			Total		4,400	1,000	14,800	12,800	15,400	18,000	15,600	12,800	20,800	21,000	13,700	21,300	9,500	9,600	10,400
		Percent			92.9	75.8	89.1	76.8	77.8	74.7	72.7	77.5	75.9	63.6	75.2	81.1	66.5	75.2	69.8
		Im:Ad			0.8	2.6	0.7	1.2	3.0	2.3	1.0	1.3	1.0	1.1	1.2	0.6	0.8	0.9	1.2
		M:F (Ad)			1.4	(2.3)	1.3	1.4	2.5	2.0	2.4	2.9	5.2	3.6	2.4	3.2	(3.5)	2.7	(1.8)
		M:F (Im)			2.3	1.1	1.5	1.9	1.1	1.2	1.5	3.1	2.9	2.8	1.8	2.9	(3.5)	2.4	1.7
	3	Number	Ad M		17,300	5,600	18,400	20,200	11,600	20,600	41,000	44,800	32,500	57,000	26,900	61,500	59,200	45,900	20,200
			Ad F		5,600	1,500	8,500	7,000	4,100	8,500	13,300	4,400	6,000	9,700	6,900	11,000	13,600	12,900	6,100
			Im M		4,900	2,100	9,500	5,800	6,100	9,400	16,400	11,500	15,700	17,800	9,900	31,300	21,900	17,500	11,200
			Im F		3,600	1,700	5,400	4,900	3,000	6,100	10,400	2,500	5,600	9,600	5,300	12,900	9,100	8,000	8,200
			Total		31,400	10,900	41,900	38,000	24,900	44,700	81,100	63,300	59,900	94,200	49,000	116,600	103,700	84,300	45,700
		Percent			81.3	74.9	71.6	74.6	52.2	55.3	64.9	86.5	67.7	72.8	69.3	60.3	64.9	58.7	50.2
		Im:Ad			0.4	0.5	0.6	0.4	0.6	0.5	0.5	0.3	0.6	0.4	0.5	0.6	0.4	0.4	0.7
		M:F (Ad)			3.1	3.7	2.2	2.9	2.8	2.4	3.1	10.1	5.4	5.9	3.9	5.6	4.4	3.6	3.3
		M:F (Im)			1.3	1.3	1.8	1.2	2.0	1.5	1.6	4.5	2.8	1.9	1.9	2.4	2.4	2.2	1.4
	Combined	Number	Ad M		24,700	5,800	23,500	23,700	14,400	24,300	46,600	48,900	41,300	65,000	31,800	71,700	63,300	49,600	23,300
			Ad F		8,300	1,600	12,300	9,400	5,200	10,300	15,600	5,800	7,700	11,900	8,800	14,100	14,800	14,300	7,800
			Im M		7,900	2,500	13,100	10,300	12,100	16,300	20,900	17,000	23,500	25,800	14,900	37,100	25,100	20,700	14,800
			Im F		5,100	2,000	7,800	7,300	8,600	11,700	13,500	4,300	8,300	12,500	8,100	14,900	10,000	9,400	10,300
			Total	73,500	46,000	11,900	56,700	50,800	40,300	62,600	96,700	76,100	80,800	115,100	63,700	137,900	113,200	93,900	56,100
		Percent		70.8	83.5	75.0	75.5	75.1	59.7	59.7	66.1	84.9	69.6	70.9	70.8	62.8	65.1	60.1	53.0
		Im:Ad			0.4	0.6	0.6	0.5	1.1	0.8	0.5	0.4	0.6	0.5	0.6	0.6	0.4	0.5	0.8
		M:F (Ad)			3.0	3.6	1.9	2.5	2.8	2.4	3.0	8.4	5.4	5.5	3.6	5.1	4.3	3.5	3.0
		M:F (Im)			1.6	1.2	1.7	1.4	1.4	1.4	1.5	3.9	2.8	2.1	1.8	2.5	2.5	2.2	1.4
Kansas	1	Number	Ad M		3,900	1,300	3,300	3,200	800	3,200	2,700	3,600	1,200	5,000	2,800	4,000	5,400	2,800	2,300
			Ad F		1,700	200	500	500	400	1,100	700	1,200	600	1,800	900	1,600	1,200	1,200	200
			Im M		2,600	300	900	1,400	700	2,900	2,100	1,000	2,000	3,100	1,700	2,800	3,000	1,100	tr.
			Im F		1,600	300	400	900	700	1,000	1,500	100	800	2,300	1,000	1,500	700	900	700
			Total		9,700	2,000	5,100	5,900	2,600	8,200	7,100	5,800	4,600	12,300	6,300	9,800	10,400	6,000	3,200
		Percent			57.3	(59.7)	46.4	58.7	22.4	37.3	31.7	50.0	28.6	41.1	40.8	45.2	(64.7)	(49.5)	(34.7)
		Im:Ad			0.7	0.4	0.4	0.6	1.2	0.9	1.1	0.2	(1.6)	0.8	0.7	0.8	0.6	(0.5)	(0.3)
		M:F (Ad)			2.2	(7.7)	6.6	5.7	(2.2)	(2.8)	(3.7)	(3.1)	(2.0)	2.8	3.2	(2.5)	(4.4)	(2.3)	(10.0)
		M:F (Im)			1.6	(0.8)	(2.2)	1.6	(1.0)	(2.9)	(1.4)	(8.2)	(2.6)	(1.4)	1.8	(1.9)	(4.3)	(1.3)	(tr.)

Table A-11.--continued. Size, age, and sex characteristics of the annual mallard harvest by harvest area and State of harvest, 1960-1974. (All mallard bloodlines and all U. S. waterfowl seasons included; Ad = adult, Im = immature, M = male, F = female.)

State and Flyway	Harvest area	Parameter estimated	Hunting Season 1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1961-1970 Average	1971-72	1972-73	1973-74	1974-75
Central Flyway																		
Kansas	2	Ad M		6,600	2,400	5,000	9,100	7,000	9,800	17,800	17,800	19,000	25,000	11,900	51,100	69,500	35,200	25,600
		Ad F		3,200	900	2,200	3,600	2,200	4,300	5,500	6,200	5,000	11,200	4,400	16,800	11,000	9,100	5,300
		Im M		2,900	2,000	3,800	4,000	3,900	5,800	11,200	7,100	9,800	13,800	6,400	26,500	23,300	15,700	23,800
		Im F		2,300	1,300	4,100	2,300	3,400	5,300	7,900	5,400	8,800	8,800	5,000	17,900	8,600	9,800	10,600
		Total		15,100	6,600	15,000	19,000	16,500	25,200	42,400	36,600	42,500	58,900	27,800	112,400	112,400	69,800	65,200
		Percent		25.3	26.9	24.9	25.5	21.3	30.8	30.0	48.6	29.0	29.2	29.5	41.0	44.4	33.1	43.7
		Im:Ad		0.5	1.0	1.1	0.5	0.8	0.8	0.8	0.5	0.8	0.6	0.7	0.7	0.4	0.6	1.1
		M:F (Ad)		2.1	2.7	2.2	2.5	3.2	2.3	3.2	2.9	3.8	2.2	2.7	3.0	6.3	3.9	4.8
		M:F (Im)		1.3	1.5	0.9	1.7	1.2	1.1	1.4	1.3	1.1	1.6	1.3	1.5	2.7	1.6	2.3
	3	Ad M		5,600	600	1,700	4,300	3,600	10,600	22,400	22,000	15,000	17,900	10,400	32,900	49,800	40,900	18,600
		Ad F		2,800	300	1,000	1,800	900	4,200	8,000	5,300	5,100	7,300	3,700	9,500	7,000	10,600	5,400
		Im M		2,600	700	1,100	2,400	1,600	5,400	11,800	4,500	11,000	11,100	5,200	24,700	23,700	18,400	19,700
		Im F		2,000	300	600	1,700	1,600	3,800	8,500	4,200	8,400	9,700	4,100	17,400	9,500	9,200	11,800
		Total		13,000	1,800	4,400	10,200	7,600	23,900	50,700	35,900	39,500	46,000	23,300	84,400	90,100	79,100	55,400
		Percent		33.9	29.5	25.3	31.0	21.8	42.7	37.8	56.5	40.3	40.2	39.2	48.1	56.9	53.8	41.3
		Im:Ad		0.6	1.1	0.6	0.7	0.7	0.6	0.7	0.3	1.0	0.8	0.7	1.0	0.6	0.5	1.3
		M:F (Ad)		2.0	(2.0)	(1.6)	2.4	4.0	2.5	2.8	4.2	2.9	2.5	2.8	3.5	7.1	3.9	3.5
		M:F (Im)		(1.3)	(2.2)	(1.9)	(1.4)	1.0	1.4	1.4	1.1	1.3	1.1	1.3	1.4	2.5	2.0	1.7
	Combined	Ad M		16,100	4,200	9,900	16,600	11,400	23,600	43,000	43,400	35,200	48,000	25,100	88,000	124,700	78,900	46,400
		Ad F		7,700	1,300	3,700	6,000	3,400	9,600	14,200	12,700	10,700	20,300	9,000	27,900	19,300	20,900	10,900
		Im M		8,100	2,900	5,800	7,700	6,200	14,200	25,200	12,500	22,800	28,000	13,400	53,900	50,000	35,200	43,500
		Im F		5,900	2,000	5,100	4,900	5,700	10,000	17,900	9,800	18,000	20,800	10,000	36,800	18,800	19,800	23,000
		Total	79,700	37,800	10,400	24,500	35,200	26,700	57,400	100,300	78,300	86,600	117,100	57,400	206,600	212,800	154,800	123,800
		Percent	47.4	32.9	30.6	27.7	29.9	21.5	36.0	33.7	52.1	33.2	33.9	33.9	43.8	49.8	41.9	42.3
		Im:Ad		0.6	0.9	0.8	0.6	0.8	0.7	0.8	0.4	0.9	0.7	0.7	0.8	0.5	0.6	1.2
		M:F (Ad)		2.1	3.2	2.6	2.8	3.3	2.5	3.0	3.4	3.3	2.4	2.8	3.2	6.5	3.8	4.3
		M:F (Im)		1.4	1.5	1.1	1.6	1.1	1.4	1.4	1.3	1.3	1.3	1.3	1.5	2.7	1.8	1.9
New Mexico	1	Ad M		100										100				
		Ad F		tr.										tr.				
		Im M		100										100				
		Im F		100										100				
		Total		400	← Area 1 in Pacific Flyway →									400	← Area 1 in Pacific Flyway →			
		Percent		(89.5)										(89.5)				
		Im:Ad		(1.0)										(1.0)				
		M:F (Ad)		(3.0)										(3.0)				
		M:F (Im)		(0.8)										(0.8)				
	2	Ad M		1,100	700	2,500	1,800	700	2,000	3,200	3,700	4,600	4,200	2,500	4,400	3,900	1,600	6,900
		Ad F		500	200	1,200	1,100	400	1,500	1,600	2,300	1,400	1,600	1,200	1,900	1,400	800	1,600
		Im M		500	300	2,100	1,300	700	2,500	2,600	3,500	3,100	3,400	2,000	1,900	3,100	1,200	4,100
		Im F		900	500	2,400	1,300	600	1,900	1,500	2,300	700	2,400	1,400	800	1,300	1,100	1,600
		Total		3,000	1,800	8,200	5,600	2,400	7,900	8,900	11,800	9,700	11,600	7,100	9,000	9,700	4,700	14,100
		Percent		32.2	49.5	36.2	32.1	14.7	28.4	33.2	47.6	43.9	35.0	34.8	31.2	31.2	35.2	36.5
		Im:Ad		0.9	1.0	1.2	0.9	1.1	1.2	0.8	1.0	0.6	1.0	1.0	0.4	0.8	0.9	0.7
		M:F (Ad)		2.2	(3.3)	2.2	1.6	1.6	1.4	1.9	1.6	3.3	2.7	2.1	2.4	2.9	2.0	4.3
		M:F (Im)		0.6	(0.6)	0.9	1.0	1.2	1.3	1.8	1.6	4.7	1.4	1.4	(2.2)	2.4	1.0	2.6
	Combined	Ad M		1,200	700	2,500	1,800	700	2,000	3,200	3,700	4,600	4,200	2,500	4,400	3,900	1,600	6,900
		Ad F		500	200	1,200	1,100	400	1,500	1,600	2,300	1,400	1,600	1,200	1,900	1,400	800	1,600
		Im M		600	300	2,100	1,300	700	2,500	2,600	3,500	3,100	3,400	2,000	1,900	3,100	1,200	4,100
		Im F		1,000	500	2,400	1,300	600	1,900	1,500	2,300	700	2,400	1,500	800	1,300	1,100	1,600
		Total	4,700	3,400	1,800	8,200	5,600	2,400	7,900	8,900	11,800	9,700	11,600	7,100	9,000	9,700	4,700	14,100
		Percent	57.7	34.8	49.5	36.2	32.1	14.7	28.4	33.2	47.6	43.9	35.0	34.9	31.2	31.2	35.2	36.5
		Im:Ad		0.9	1.0	1.2	0.9	1.1	1.2	0.8	1.0	0.6	1.0	1.0	0.4	0.8	0.9	0.7
		M:F (Ad)		2.3	(3.3)	2.2	1.6	1.6	1.4	1.9	1.6	3.3	2.7	2.1	2.4	2.9	2.0	4.3
		M:F (Im)		0.6	(0.6)	0.9	1.0	1.2	1.3	1.8	1.6	4.7	1.4	1.4	(2.2)	2.4	1.0	2.6

Oklahoma	1	Ad M		2,800	1,900	1,200	5,200	2,300	7,700	4,700	4,400	3,900	6,100	4,000	9,300	7,500	8,200	6,700
		Ad F		2,000	1,200	600	1,400	1,000	2,800	2,100	1,800	400	3,400	1,700	3,200	1,800	3,100	1,800
		Im M		900	500	800	2,100	900	4,600	4,000	1,100	2,600	3,300	2,100	3,000	900	3,400	5,000
		Im F		1,400	1,100	900	2,200	500	3,600	2,800	1,200	1,500	1,300	1,600	2,000	1,100	1,800	1,900
		Total		7,100	4,700	3,600	10,800	4,700	18,700	13,600	8,500	8,300	14,200	9,400	17,500	11,400	16,500	15,400
		Percent		37.6	52.4	25.3	38.5	17.2	34.1	27.3	51.9	18.5	28.8	30.1	31.2	25.5	30.2	32.5
		Im:Ad		0.5	0.5	0.9	0.6	0.4	0.8	1.0	0.4	0.9	0.5	0.7	0.4	0.2	0.5	0.8
		M:F (Ad)		(1.4)	1.6	(2.0)	3.8	2.2	2.7	2.2	2.5	(9.7)	1.8	2.4	2.9	4.1	2.7	3.7
		M:F (Im)		(0.6)	(0.5)	(0.8)	1.0	(1.9)	1.3	1.4	(0.9)	(1.8)	(2.5)	1.3	(1.5)	(0.8)	(1.8)	2.7
	2	Ad M		8,600	2,000	3,200	13,400	3,800	13,400	14,300	20,700	17,900	26,500	12,400	36,300	57,700	49,500	33,000
		Ad F		4,200	800	1,600	4,400	1,600	6,200	6,800	5,800	6,200	6,500	4,400	7,800	12,100	11,500	7,300
		Im M		5,900	1,000	2,000	6,100	2,200	7,400	8,200	5,200	7,300	12,600	5,800	17,500	16,100	15,800	32,200
		Im F		4,700	700	1,800	3,700	1,900	7,200	7,200	3,900	7,500	8,700	4,700	11,300	7,900	9,700	14,800
		Total		23,400	4,500	8,700	27,600	9,400	34,200	36,500	35,500	38,900	54,300	27,300	72,900	93,800	86,600	87,300
		Percent		55.8	31.3	35.1	45.4	19.1	37.4	25.7	65.9	37.5	40.0	38.0	48.3	51.5	48.1	55.8
		Im:Ad		0.8	0.6	0.8	0.6	0.8	0.7	0.7	0.3	0.6	0.6	0.6	0.7	0.3	0.4	1.2
		M:F (Ad)		(2.0)	2.5	2.0	3.0	2.4	2.2	2.1	3.6	2.9	4.1	2.8	4.7	4.8	4.3	4.5
		M:F (Im)		(1.3)	(1.4)	1.1	1.6	1.2	1.0	1.1	1.3	1.0	1.4	1.2	1.6	2.0	1.6	2.2
	Combined	Ad M		11,400	4,000	4,400	18,500	6,000	21,100	19,000	25,100	21,800	32,600	16,400	45,600	65,200	57,800	39,700
		Ad F		6,200	2,000	2,200	5,800	2,600	9,100	8,900	7,600	6,600	9,900	6,100	11,000	13,900	14,600	9,100
		Im M		6,800	1,600	2,800	8,200	3,100	12,000	12,200	6,200	9,900	15,900	7,900	20,600	17,000	19,100	37,200
		Im F		6,100	1,800	2,800	5,900	2,300	10,700	10,000	5,100	8,900	10,100	6,400	13,300	9,100	11,600	16,700
		Total	60,700	30,500	9,300	12,300	38,300	14,100	52,900	50,100	44,000	47,200	68,500	36,700	90,400	105,200	103,100	102,700
		Percent	47.0	50.2	39.4	31.5	43.2	18.5	36.1	26.1	62.6	31.7	37.1	35.6	43.6	46.4	43.9	50.4
		Im:Ad		0.7	0.6	0.8	0.6	0.6	0.8	0.8	0.3	0.7	0.6	0.6	0.6	0.3	0.4	1.1
		M:F (Ad)		1.8	2.0	2.0	3.2	2.3	2.3	2.1	3.3	3.3	3.3	2.7	4.1	4.7	4.0	4.4
		M:F (Im)		1.1	0.9	1.0	1.4	1.3	1.1	1.2	1.2	1.1	1.6	1.2	1.5	1.9	1.7	2.2
Texas	1	Ad M		700	1,500	2,800	4,600	1,900	4,200	3,700	4,200	6,500	14,700	4,500	5,200	15,300	39,500	21,000
		Ad F		600	500	1,000	1,100	1,100	1,000	1,700	1,000	3,200	2,000	1,300	2,100	1,100	5,300	1,500
		Im M		1,200	500	1,300	1,300	600	2,800	1,500	300	2,200	3,800	1,600	1,800	3,300	8,800	9,900
		Im F		2,200	500	1,000	1,500	800	1,400	1,000	1,400	1,600	1,800	1,300	2,200	1,400	5,500	1,300
		Total		4,700	2,900	6,200	8,400	4,400	9,400	8,000	6,800	13,500	22,300	8,700	11,300	21,100	59,100	33,700
		Percent		28.2	20.0	16.4	22.3	15.9	16.0	16.2	23.0	22.5	29.5	21.3	22.7	24.8	49.0	37.5
		Im:Ad		(2.7)	0.5	0.6	0.5	(0.5)	0.8	(0.5)	(0.3)	0.4	0.3	0.5	(0.6)	(0.3)	0.3	0.5
		M:F (Ad)		(1.1)	(3.3)	2.7	4.1	(1.6)	(4.1)	(2.2)	(4.3)	2.0	7.5	3.4	(2.4)	(14.0)	7.5	(13.7)
		M:F (Im)		(0.5)	(0.9)	(1.3)	(0.9)	(0.8)	(1.9)	(1.5)	(0.2)	(1.4)	(2.1)	1.2	(0.8)	(2.5)	(1.6)	(7.6)
	2	Ad M		8,200	7,700	9,700	16,100	11,100	11,700	11,400	18,100	17,200	34,800	14,600	27,700	56,800	48,000	28,400
		Ad F		4,400	3,300	4,800	5,600	5,600	8,500	6,300	6,900	6,100	14,300	6,600	10,000	17,400	10,600	5,200
		Im M		3,500	3,400	4,800	8,200	5,900	9,400	8,600	3,600	15,900	16,800	8,000	13,100	8,000	13,500	30,800
		Im F		3,200	3,300	6,000	7,000	4,300	6,500	7,200	2,800	13,000	11,900	6,500	11,900	8,500	9,300	16,700
		Total		19,300	17,800	25,200	36,900	26,900	36,100	33,500	31,300	52,100	77,700	35,700	62,500	90,700	81,300	81,100
		Percent		34.4	37.4	33.3	26.5	21.8	25.3	30.0	31.1	19.8	24.2	25.8	32.1	34.5	32.2	32.5
		Im:Ad		0.5	0.6	0.7	0.7	0.6	0.8	0.9	0.3	1.2	0.6	0.7	0.7	0.2	0.4	1.4
		M:F (Ad)		1.9	2.3	2.0	2.9	2.0	1.4	1.8	2.6	2.8	2.4	2.2	2.8	3.3	4.5	5.5
		M:F (Im)		(1.1)	1.0	0.8	1.2	1.4	1.4	1.2	(1.3)	1.2	1.4	1.2	1.1	0.9	1.5	1.8
	3	Ad M		2,500	3,400	6,500	11,200	8,400	16,600	8,700	9,500	9,500	14,300	9,100	7,900	13,100	7,600	9,100
		Ad F		1,600	1,700	2,400	5,900	3,500	8,400	6,700	6,900	5,600	9,200	5,200	4,900	6,000	2,800	3,900
		Im M		1,100	3,400	3,800	6,300	5,500	15,100	7,400	3,400	19,100	16,600	8,200	2,500	7,200	1,900	11,600
		Im F		400	3,000	4,300	5,500	5,300	13,100	7,700	1,900	9,800	17,000	6,800	4,300	6,000	2,400	9,800
		Total		5,600	11,500	16,900	28,900	22,700	53,100	30,500	21,800	44,000	57,100	29,200	19,700	32,200	14,800	34,500
		Percent		4.2	15.3	11.0	10.3	8.7	9.1	7.6	8.7	6.4	7.1	8.0	4.9	5.0	3.7	6.2
		Im:Ad		(0.4)	1.3	0.9	0.7	0.9	1.1	1.0	0.3	1.9	1.4	1.0	0.5	0.7	0.4	1.7
		M:F (Ad)		(1.6)	2.1	2.7	1.9	2.4	2.0	1.3	1.4	(1.7)	1.5	1.7	1.6	2.2	(2.7)	(2.3)
		M:F (Im)		(2.5)	1.1	0.9	1.2	1.0	1.2	1.0	(1.8)	2.0	1.0	1.2	(0.6)	(1.2)	(0.8)	1.2
	Combined	Ad M		11,400	12,700	19,000	31,800	21,300	32,500	23,800	31,800	33,200	63,700	28,100	40,700	85,200	95,100	58,500
		Ad F		6,600	5,400	8,200	12,700	10,200	17,900	14,700	14,800	14,800	25,400	13,100	17,000	24,400	18,700	10,600
		Im M		5,800	7,300	9,900	15,700	12,100	27,200	17,600	7,300	37,200	37,200	17,700	17,400	18,500	24,200	52,300
		Im F		5,900	6,800	11,300	14,000	10,400	21,000	15,900	6,100	24,400	30,700	14,700	18,400	15,800	17,200	27,800
		Total	82,500	29,600	32,200	48,300	74,200	54,000	98,600	72,100	60,000	109,600	157,100	73,600	93,500	144,000	155,200	149,200
		Percent	22.8	14.3	23.5	18.1	16.2	13.1	12.6	12.7	15.7	10.9	13.1	13.6	14.4	14.4	20.1	16.7
		Im:Ad		0.6	0.8	0.8	0.7	0.7	1.2	0.9	0.3	1.3	0.8	0.8	0.6	0.3	0.4	1.2
		M:F (Ad)		1.7	2.3	2.3	2.5	2.1	1.8	1.6	2.1	2.2	2.5	2.1	2.4	3.5	5.1	5.5
		M:F (Im)		1.0	1.1	0.9	1.1	1.2	1.3	1.1	1.2	1.5	1.2	1.2	0.9	1.2	1.4	1.9

Table A-11.--continued. Size, age, and sex characteristics of the annual mallard harvest by harvest area and State of harvest, 1960-1974. (All mallard bloodlines and all U. S. waterfowl seasons included; Ad = adult, Im = immature, M = male, F = female.)

State and Flyway	Harvest area	Parameter estimated	Hunting Season 1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1961-1970 Average	1971-72	1972-73	1973-74	1974-75
Mississippi Flyway																		
Minnesota	1	Number: Ad M		5,500	3,200	6,300	10,000	3,500	1,900	5,900	2,600	4,600	4,600	4,800	3,100	9,200	3,500	2,900
		Number: Ad F		4,700	3,300	8,600	5,800	3,000	3,900	6,800	3,600	5,200	8,100	5,300	6,200	7,100	2,900	4,500
		Number: Im M		6,800	7,500	17,800	31,400	11,900	20,200	16,200	8,800	20,700	15,700	15,700	21,700	16,800	15,500	21,500
		Number: Im F		5,100	6,900	14,000	19,500	6,000	10,500	15,900	6,800	16,300	19,800	12,100	13,500	11,900	9,500	13,300
		Number: Total		22,100	20,800	46,700	66,700	24,500	36,500	44,900	21,700	46,900	48,200	37,900	44,500	45,000	31,300	42,200
		Percent		46.3	40.1	46.2	36.9	25.3	36.5	38.8	30.2	19.2	29.7	32.3	27.9	28.4	22.0	30.9
		Im:Ad		1.2	2.2	2.1	3.2	2.7	5.4	2.5	2.5	3.7	2.8	2.7	3.8	1.8	3.9	4.7
		M:F (Ad)		1.2	1.0	0.7	1.7	(1.2)	(0.5)	(0.9)	(0.7)	(0.9)	(0.6)	0.9	(0.5)	(1.3)	(1.2)	(0.6)
		M:F (Im)		1.3	1.1	1.3	1.6	2.0	1.9	1.0	1.3	1.3	0.8	1.3	1.6	1.4	1.6	1.6
	2	Number: Ad M		3,100	1,400	2,300	3,900	1,000	5,100	3,100	1,400	300	3,100	2,500	3,500	2,200	400	0
		Number: Ad F		2,600	3,800	6,200	6,200	1,400	9,100	7,600	800	1,700	7,600	4,700	5,800	5,100	900	6,600
		Number: Im M		11,400	8,700	13,400	15,700	9,200	18,100	19,100	3,200	4,900	22,900	12,700	15,300	18,800	8,300	10,600
		Number: Im F		11,000	7,000	11,400	10,100	2,400	16,700	13,800	3,600	3,300	18,900	9,800	14,600	19,700	8,600	12,700
		Number: Total		28,000	20,900	33,300	35,900	14,000	49,000	43,500	9,000	10,100	52,500	29,700	39,200	45,800	18,200	30,000
		Percent		35.1	32.9	41.7	35.9	12.2	27.9	35.4	23.2	11.0	35.4	29.2	26.9	33.1	22.2	25.8
		Im:Ad		4.0	3.0	2.9	2.5	4.8	2.5	3.1	3.0	(4.2)	3.9	3.1	3.2	5.3	12.4	3.5
		M:F (Ad)		(1.2)	0.4	0.4	(0.6)	(0.7)	(0.6)	(0.4)	(1.6)	(0.2)	(0.4)	0.5	(0.6)	(0.4)	(0.4)	(0)
		M:F (Im)		1.0	1.2	1.2	1.6	(3.8)	1.1	1.4	(0.9)	(1.5)	1.2	1.3	1.0	1.0	1.0	0.8
	3	Number: Ad M		3,700	1,900	3,100	6,100	2,000	1,900	3,800	3,100	4,500	1,500	3,200	3,300	3,600	2,000	1,000
		Number: Ad F		3,600	2,500	3,700	6,300	1,200	3,800	4,700	5,500	6,900	5,700	4,400	8,100	13,400	2,600	5,200
		Number: Im M		8,300	5,300	15,400	20,400	4,600	9,700	13,100	8,700	17,800	20,100	12,300	22,700	17,200	9,700	22,500
		Number: Im F		6,100	4,500	14,400	16,100	6,300	12,000	15,500	11,400	21,600	15,700	12,300	23,300	23,600	8,100	22,700
		Number: Total		21,600	14,200	36,500	48,900	14,100	27,400	37,100	28,600	50,800	42,900	32,200	57,400	57,900	22,400	51,400
		Percent		47.6	42.1	44.4	27.0	11.9	22.5	25.0	24.9	21.2	29.4	26.1	26.9	35.0	28.0	39.2
		Im:Ad		2.0	2.2	4.4	2.9	(3.3)	3.8	3.4	2.3	3.5	5.0	3.3	4.0	2.4	3.9	7.3
		M:F (Ad)		(1.0)	0.8	0.8	1.0	(1.6)	(0.5)	(0.8)	(0.6)	(0.7)	(0.3)	0.7	(0.4)	(0.3)	(0.8)	(0.2)
		M:F (Im)		(1.4)	1.2	1.1	1.3	(0.7)	0.8	0.9	0.8	0.8	1.3	1.0	1.0	0.7	1.2	1.0
	4	Number: Ad M		14,200	5,900	12,600	13,800	11,700	12,600	18,700	5,500	7,300	15,500	11,800	14,500	35,900	7,200	5,100
		Number: Ad F		8,500	4,800	10,000	12,800	9,600	9,600	15,600	3,700	6,200	15,700	9,600	17,400	17,100	5,800	4,100
		Number: Im M		15,100	10,100	22,900	18,900	18,600	26,700	38,500	13,600	28,200	30,000	22,300	26,800	25,400	15,600	28,600
		Number: Im F		11,100	8,400	15,600	17,800	12,700	24,100	36,100	10,100	18,300	24,800	17,900	22,900	27,400	13,700	22,200
		Number: Total		48,900	29,100	61,100	63,300	52,600	73,000	108,900	32,900	60,000	85,900	61,600	81,600	105,800	42,300	60,000
		Percent		54.0	39.4	38.4	28.0	28.3	31.6	36.6	26.9	23.6	34.7	32.6	28.1	41.1	29.3	32.9
		Im:Ad		1.2	1.7	1.7	1.4	1.5	2.3	2.2	2.6	3.5	1.8	1.9	1.6	1.0	2.3	5.6
		M:F (Ad)		1.7	1.2	1.3	1.1	1.2	1.3	1.2	1.5	(1.2)	1.0	1.2	0.8	2.1	1.3	(1.3)
		M:F (Im)		1.4	1.2	1.5	1.1	1.5	1.1	1.1	1.3	1.5	1.2	1.2	1.2	0.9	1.1	1.3
	5	Number: Ad M		12,000	4,100	8,200	11,700	11,300	19,300	15,200	10,800	7,900	9,600	11,000	12,300	25,500	9,200	9,200
		Number: Ad F		9,400	3,800	11,400	9,000	5,000	13,400	15,200	9,600	11,500	6,700	9,500	12,500	13,300	8,000	7,700
		Number: Im M		18,600	11,500	17,800	20,100	21,600	38,200	38,600	20,100	21,100	27,000	23,500	18,200	35,900	19,000	26,800
		Number: Im F		14,300	9,400	14,300	15,800	19,400	29,300	26,900	20,400	15,500	25,900	19,100	14,000	27,700	15,600	28,900
		Number: Total		54,300	28,700	51,700	56,600	57,400	100,200	95,900	60,900	56,100	69,300	63,100	57,000	102,400	51,700	72,600
		Percent		47.5	44.6	34.4	28.5	20.9	32.2	32.7	29.5	22.3	28.1	29.9	22.8	42.4	35.5	35.7
		Im:Ad		1.5	2.7	1.6	1.7	2.5	2.1	2.1	2.0	1.9	3.2	2.1	1.3	1.6	2.0	3.3
		M:F (Ad)		1.3	1.1	0.7	1.3	2.2	1.4	1.0	1.1	0.7	1.4	1.2	1.0	1.9	1.1	1.2
		M:F (Im)		1.3	1.2	1.2	1.3	1.1	1.3	1.4	1.0	1.4	1.0	1.2	1.3	1.3	1.2	0.9
Combined		Number: Ad M	38,800	38,500	16,300	32,400	45,500	29,500	40,700	46,700	23,500	24,600	34,300	33,200	36,700	76,400	22,300	18,200
		Number: Ad F	54,300	28,800	18,100	39,900	40,200	20,300	39,700	49,900	23,200	31,500	43,700	33,500	49,900	56,000	20,200	28,000
		Number: Im M	146,200	60,200	43,100	87,300	106,500	66,000	113,000	125,500	54,200	92,700	115,800	86,400	104,700	114,100	68,000	110,100
		Number: Im F	126,400	47,500	36,200	69,700	79,200	46,800	92,700	108,200	52,300	75,000	105,100	71,300	88,300	110,300	55,400	99,900
		Number: Total	365,700	175,000	113,800	229,300	271,400	162,600	286,100	330,300	153,100	223,800	298,900	224,400	279,600	356,900	165,900	256,100
		Percent	45.4	46.3	39.6	40.1	30.6	20.6	30.4	33.8	27.6	20.7	31.4	30.2	26.4	37.1	27.9	33.3
		Im:Ad	2.9	1.6	2.3	2.2	2.2	2.3	2.6	2.4	2.3	3.0	2.8	2.4	2.2	1.7	2.9	4.5
		M:F (Ad)	0.7	1.3	0.9	0.8	1.1	1.5	1.0	0.9	1.0	0.8	0.8	1.0	0.7	1.4	1.1	0.6
		M:F (Im)	1.2	1.3	1.2	1.3	1.3	1.4	1.2	1.2	1.0	1.2	1.1	1.2	1.2	1.0	1.2	1.1

Wisconsin	1	Number	Ad M		4,400	400	1,700	1,600	1,600	1,900	2,700	1,700	600	6,700	2,300	6,000	2,700	2,200	1,600
			Ad F		4,800	1,100	3,300	3,000	700	3,400	2,800	3,200	4,000	5,300	3,200	3,100	2,800	3,100	700
			Im M		6,900	3,600	7,300	10,300	8,500	9,500	12,900	5,600	9,000	16,800	9,000	14,200	7,500	10,000	11,400
			Im F		8,400	3,600	7,900	8,600	7,800	10,400	6,000	4,800	9,600	17,700	8,500	11,500	5,100	10,600	12,400
			Total		24,500	8,700	20,200	23,500	18,600	25,300	24,500	15,300	23,200	46,500	23,000	34,900	18,100	25,900	26,100
		Percent			38.0	35.9	35.7	36.8	22.8	28.3	24.4	25.5	26.1	33.2	30.5	33.3	23.7	34.0	31.0
		Im:Ad			1.7	4.9	3.0	4.1	7.2	3.7	3.4	2.1	4.0	2.9	3.2	2.8	2.3	3.9	10.2
		M:F (Ad)			(0.9)	(0.4)	0.5	0.5	(2.4)	(0.6)	(1.0)	(0.5)	(0.2)	(1.3)	0.7	(1.9)	(1.0)	(0.7)	(2.3)
		M:F (Im)			0.8	1.0	0.9	1.2	(1.1)	0.9	2.2	1.2	0.9	0.9	1.1	1.2	1.5	0.9	0.9
	2	Number	Ad M		8,500	4,100	3,700	7,800	6,200	9,700	9,000	2,500	4,300	4,900	6,100	9,400	8,000	7,300	3,500
			Ad F		8,800	2,800	3,600	6,900	1,700	7,500	3,200	1,600	1,300	5,200	4,300	9,500	6,600	4,900	3,500
			Im M		7,900	8,400	6,800	12,300	4,600	13,400	15,400	6,500	7,500	15,600	9,800	17,500	18,900	12,300	23,200
			Im F		13,200	6,400	6,400	12,800	6,500	12,200	13,000	5,500	8,700	11,500	9,600	14,700	18,700	11,200	19,400
			Total		38,400	21,700	20,600	39,800	19,000	42,900	40,600	16,100	21,800	37,200	29,800	51,000	52,300	35,700	49,600
		Percent			65.0	36.9	37.5	42.4	25.2	32.7	40.2	30.5	18.9	24.5	33.3	28.3	42.7	37.3	42.7
		Im:Ad			1.2	2.2	1.8	1.7	(1.4)	1.5	2.3	2.9	2.9	2.7	1.9	1.7	2.6	1.9	6.1
		M:F (Ad)			1.0	1.5	1.0	1.1	(3.7)	1.3	(2.8)	(1.6)	(3.2)	(0.9)	1.4	1.0	(1.2)	1.5	(1.0)
		M:F (Im)			0.6	1.3	1.1	1.0	(0.7)	1.1	1.2	1.2	0.9	1.4	1.0	1.2	1.0	1.1	1.2
	3	Number	Ad M		14,000	4,500	5,900	13,100	8,900	15,100	13,400	6,000	16,300	9,600	10,700	28,000	20,600	16,400	13,600
			Ad F		13,900	7,800	10,700	9,000	8,000	18,900	21,300	7,700	13,200	12,600	12,300	21,000	16,200	14,700	25,500
			Im M		36,300	18,200	20,000	35,900	25,300	43,400	41,000	24,600	46,900	48,700	34,000	49,200	45,500	51,100	95,200
			Im F		24,700	16,700	20,900	29,900	28,100	40,900	35,300	25,000	37,500	36,000	29,500	41,300	38,500	44,700	93,200
			Total		88,800	47,100	57,400	87,900	70,400	118,400	110,900	63,300	113,800	106,800	86,500	139,500	120,800	126,900	227,600
		Percent			44.3	37.0	31.5	33.9	22.3	32.7	32.2	33.4	32.2	37.7	33.0	37.8	33.6	36.6	49.2
		Im:Ad			2.2	2.9	2.5	3.0	3.2	2.5	2.2	3.6	2.9	3.8	2.8	1.8	2.3	3.1	4.8
		M:F (Ad)			1.0	0.6	0.5	1.5	1.1	0.8	0.6	0.8	1.2	0.8	0.9	1.3	1.3	1.1	0.5
		M:F (Im)			1.5	1.1	1.0	1.2	0.9	1.1	1.2	1.0	1.3	1.4	1.2	1.2	1.2	1.1	1.0
	Combined	Number	Ad M	13,700	26,800	9,000	11,300	22,500	16,700	26,800	25,100	10,300	21,200	21,100	19,100	43,400	31,300	25,800	18,700
			Ad F	21,400	27,500	11,600	17,600	19,000	10,400	29,900	27,300	12,500	18,500	23,000	19,700	33,600	25,600	22,700	29,700
			Im M	53,600	51,100	30,300	34,100	58,400	38,400	66,300	69,300	36,600	63,300	81,100	52,900	80,900	71,900	73,500	129,800
			Im F	57,000	46,300	26,700	35,300	51,300	42,400	63,600	54,300	35,300	55,800	65,200	47,600	67,500	62,300	66,600	125,000
			Total	145,700	151,700	77,600	98,200	151,200	108,000	186,600	175,900	94,700	158,800	190,500	139,300	225,400	191,100	188,500	303,200
		Percent		34.0	48.8	36.8	33.4	36.2	22.8	32.1	32.3	31.3	28.5	33.1	32.6	34.5	34.2	36.4	45.7
		Im:Ad		3.2	1.8	2.8	2.4	2.6	3.0	2.3	2.4	3.2	3.0	3.3	2.6	1.9	2.4	2.9	5.3
		M:F (Ad)		0.6	1.0	0.8	0.6	1.2	1.6	0.9	0.9	0.8	1.1	0.9	1.0	1.3	1.2	1.1	0.6
		M:F (Im)		0.9	1.1	1.1	1.0	1.1	0.9	1.0	1.3	1.0	1.1	1.2	1.1	1.2	1.2	1.1	1.0
Michigan	1	Number	Ad M		600	200	400	300	0	300	400	600	300	800	400	900	1,300	900	2,200
			Ad F		800	200	1,100	500	500	800	600	100	300	1,400	600	800	1,100	1,200	3,400
			Im M		1,500	800	2,200	1,500	200	1,300	1,700	1,600	1,700	3,000	1,500	2,100	2,200	2,900	10,700
			Im F		1,100	800	1,500	1,300	800	1,600	2,300	2,100	2,600	1,600	1,600	2,600	2,000	1,800	9,600
			Total		4,000	2,000	5,300	3,500	1,500	3,900	5,000	4,400	4,900	6,800	4,100	6,400	6,500	6,900	25,900
		Percent			29.2	20.5	28.1	14.6	5.3	9.4	12.0	26.3	13.2	12.1	14.3	13.3	11.7	19.8	30.2
		Im:Ad			(1.7)	(4.3)	2.5	3.3	(2.3)	(2.6)	(4.2)	(5.1)	(7.4)	(2.1)	3.1	(2.7)	(1.7)	2.2	3.7
		M:F (Ad)			(0.8)	(1.2)	(0.4)	(0.6)	(0.0)	(0.4)	(0.7)	(4.0)	(0.8)	(0.6)	0.6	(1.1)	(1.1)	(0.8)	(0.6)
		M:F (Im)			(1.4)	(1.1)	(1.5)	1.2	(0.3)	(0.8)	(0.8)	(0.8)	(0.6)	(1.8)	1.0	(0.8)	(1.1)	(1.6)	1.1
	2	Number	Ad M		1,300	1,100	1,100	900	800	800	1,500	800	2,200	1,800	1,200	2,100	2,400	2,100	2,000
			Ad F		1,800	900	1,800	1,800	400	1,600	2,000	1,200	2,400	3,000	1,700	1,900	4,000	3,000	700
			Im M		6,300	2,400	4,300	6,600	2,700	5,500	5,800	5,100	6,200	10,800	5,600	5,800	11,700	6,100	9,200
			Im F		8,100	2,800	3,600	5,500	2,700	4,800	8,300	6,200	5,400	7,500	5,500	4,800	7,900	5,900	9,600
			Total		17,600	7,200	10,900	14,900	6,600	12,700	17,500	13,200	16,300	23,100	14,000	14,600	26,100	17,100	21,400
		Percent			36.6	27.0	32.5	24.5	16.0	23.0	25.5	31.1	28.6	35.7	28.1	25.0	31.3	30.5	31.4
		Im:Ad			4.5	2.6	2.7	4.4	(4.7)	4.3	4.1	5.8	2.5	3.8	3.8	2.6	3.1	2.3	7.1
		M:F (Ad)			(0.7)	(1.3)	0.6	(0.5)	(2.1)	(0.5)	(0.7)	(0.6)	(0.9)	(0.6)	0.7	(1.1)	(0.6)	(0.7)	(2.9)
		M:F (Im)			0.8	0.9	1.2	1.2	(1.0)	1.1	0.7	0.8	(1.2)	1.4	1.0	1.2	1.5	1.0	1.0
	3	Number	Ad M		3,300	2,500	3,900	5,200	3,200	9,900	10,400	3,200	6,300	11,000	5,900	13,200	10,400	17,400	14,500
			Ad F		4,100	2,900	3,400	4,400	3,800	9,600	9,900	5,400	7,500	11,800	6,300	7,100	15,400	12,700	10,500
			Im M		9,800	9,000	8,800	11,700	15,500	19,400	29,600	20,600	35,700	35,400	19,500	24,100	35,800	56,000	49,900
			Im F		7,800	9,200	8,800	8,800	13,000	17,500	27,700	17,700	29,100	23,500	16,300	19,600	29,200	46,200	50,100
			Total		25,000	23,500	24,900	30,100	35,600	56,400	77,600	46,900	78,400	81,700	48,000	63,900	90,800	132,200	125,000
		Percent			39.5	35.8	30.2	25.1	22.3	25.8	29.5	33.4	31.2	31.8	29.6	30.8	34.7	49.7	46.0
		Im:Ad			2.4	3.4	2.4	2.2	4.1	1.9	2.8	4.4	4.7	2.6	3.0	2.2	2.5	3.4	4.0
		M:F (Ad)			0.8	0.9	1.1	1.2	(0.8)	1.0	1.0	(0.6)	0.8	0.9	0.9	1.9	0.7	1.4	1.4
		M:F (Im)			1.3	1.0	1.0	1.3	1.2	1.1	1.1	1.2	1.2	1.5	1.2	1.2	1.2	1.2	1.0

Table A-11.--continued. Size, age, and sex characteristics of the annual mallard harvest by harvest area and State of harvest, 1960-1974. (All mallard bloodlines and all U. S. waterfowl seasons included; Ad = adult, Im = immature, M = male, F = female.)

State and Flyway	Harvest area	Parameter estimated	Hunting Season 1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1961-1970 Average	1971-72	1972-73	1973-74	1974-75
Mississippi Flyway																		
Mich.	Combined	Number Ad M	3,800	5,200	3,800	5,400	6,400	4,000	11,000	12,300	4,600	8,700	13,600	7,500	16,300	14,000	20,500	18,700
		Number Ad F	10,200	6,700	3,900	6,300	6,700	4,600	12,000	12,500	6,700	10,200	16,100	8,600	9,800	20,500	16,900	14,500
		Number Im M	27,400	17,600	12,200	15,400	19,800	18,500	26,100	37,100	27,300	43,600	49,200	26,700	32,000	49,800	65,000	69,800
		Number Im F	34,000	17,000	12,700	13,900	15,600	16,600	23,900	38,300	25,900	37,100	32,600	23,400	26,900	39,100	53,900	69,300
		Number Total	75,400	46,600	32,700	41,000	48,500	43,700	73,000	100,100	64,500	99,600	111,600	66,100	84,900	123,400	156,200	172,300
		Percent	31.2	37.3	32.0	30.5	23.7	19.0	23.1	26.8	32.3	28.8	29.5	27.4	27.1	30.8	43.7	40.5
		Im:Ad	4.4	2.9	3.2	2.5	2.7	4.1	2.2	3.0	4.7	4.3	2.7	3.1	2.3	2.6	3.2	4.2
		M:F (Ad)	0.4	0.8	1.0	0.9	1.0	(0.9)	0.9	1.0	0.7	0.9	0.8	0.9	1.7	0.7	1.2	1.3
		M:F (Im)	0.8	1.0	1.0	1.1	1.3	1.1	1.1	1.0	1.1	1.2	1.5	1.1	1.2	1.3	1.2	1.0
Iowa	1	Number Ad M		10,700	2,500	6,400	9,400	6,400	17,200	13,900	4,000	6,500	21,900	9,900	29,200	52,200	15,000	7,400
		Number Ad F		6,400	2,400	3,800	3,800	4,500	7,100	5,300	1,600	5,600	9,700	5,000	8,000	12,500	4,300	3,300
		Number Im M		8,500	4,000	7,200	9,500	10,900	21,000	19,900	4,800	19,100	23,200	12,800	28,400	28,800	21,700	19,500
		Number Im F		6,700	3,500	5,000	8,400	7,400	15,100	12,400	1,400	12,100	10,200	8,200	16,000	14,600	8,400	11,300
		Number Total		32,300	12,400	22,400	31,000	29,200	60,200	51,500	11,700	43,300	64,900	35,900	81,600	108,100	49,400	41,600
		Percent		57.2	53.4	31.9	38.2	34.3	38.3	44.1	37.1	37.7	36.7	39.3	46.2	53.0	46.0	39.6
		Im:Ad		0.9	1.5	1.2	1.4	1.7	1.5	1.7	1.1	2.6	1.1	1.4	1.2	0.7	1.6	2.9
		M:F (Ad)		1.7	1.1	1.7	2.5	1.4	2.4	2.6	(2.5)	(1.1)	2.3	2.0	3.7	4.2	3.5	2.2
		M:F (Im)		1.3	1.1	1.4	1.1	1.5	1.4	1.6	(3.5)	1.6	2.3	1.6	1.8	2.0	2.6	1.7
	2	Number Ad M		19,400	2,100	6,500	13,100	12,700	15,000	17,300	8,800	12,900	20,200	12,800	26,600	25,200	10,100	10,900
		Number Ad F		9,100	1,500	3,200	6,300	8,000	8,700	12,300	4,800	6,000	10,600	7,100	11,500	11,300	4,500	7,600
		Number Im M		17,200	2,900	5,700	13,400	19,000	20,900	24,900	9,700	13,200	28,700	15,600	24,900	15,500	21,800	28,600
		Number Im F		10,700	2,400	5,600	13,000	10,900	16,800	18,900	5,600	14,500	15,000	11,300	16,700	12,100	14,500	18,000
		Number Total		56,400	8,900	21,000	45,800	50,600	61,300	73,400	28,900	46,600	74,500	46,700	79,600	64,100	50,900	65,000
		Percent		68.0	40.7	30.4	45.4	37.9	40.3	45.7	44.7	39.1	38.9	42.6	39.9	45.7	48.8	48.9
		Im:Ad		1.0	1.5	1.2	1.4	1.4	1.6	1.5	1.1	1.5	1.4	1.4	1.1	0.8	2.5	2.5
		M:F (Ad)		2.1	(1.3)	2.0	2.1	1.6	1.7	1.4	1.8	2.2	1.9	1.8	2.3	2.2	2.2	1.4
		M:F (Im)		1.6	1.2	1.0	1.0	1.8	1.2	1.3	1.7	0.9	1.9	1.4	1.5	1.3	1.5	1.6
	Combined	Number Ad M	14,800	30,100	4,600	12,900	22,500	19,100	32,100	31,100	12,800	19,400	42,200	22,700	55,800	77,400	25,100	18,300
		Number Ad F	15,400	15,500	3,900	7,100	10,100	12,500	15,800	17,600	6,400	11,700	20,200	12,100	19,400	23,800	8,900	10,900
		Number Im M	29,200	25,700	6,900	12,800	22,900	29,900	41,800	44,800	14,600	32,300	51,900	28,400	53,300	44,300	43,500	48,100
		Number Im F	26,300	17,400	5,900	10,600	21,300	18,200	31,800	31,400	6,900	26,500	25,200	19,500	32,700	26,800	23,000	29,300
		Number Total	85,700	88,700	21,300	43,400	76,800	79,800	121,600	124,900	40,600	89,900	139,500	82,600	161,200	172,200	100,400	106,600
		Percent	49.8	63.6	47.3	31.2	42.2	36.5	39.3	45.0	42.2	38.4	37.8	41.1	42.8	50.0	47.4	44.8
		Im:Ad	1.8	0.9	1.5	1.2	1.4	1.5	1.5	1.6	1.1	1.9	1.2	1.4	1.1	0.7	2.0	2.7
		M:F (Ad)	1.0	1.9	1.2	1.8	2.2	1.5	2.0	1.8	2.0	1.7	2.1	1.9	2.9	3.3	2.8	1.7
		M:F (Im)	1.1	1.5	1.2	1.2	1.1	1.6	1.3	1.4	2.1	1.2	2.1	1.5	1.6	1.7	1.9	1.6
Illinois	1	Number Ad M		41,600	12,600	27,500	32,600	21,000	36,000	44,200	22,400	29,500	69,900	33,700	50,400	56,400	29,400	26,600
		Number Ad F		18,800	4,500	12,400	15,300	7,500	20,400	26,500	9,400	16,000	17,900	14,900	11,000	16,700	9,600	8,700
		Number Im M		26,800	8,100	22,600	24,600	22,800	42,400	40,700	12,900	30,100	44,300	27,500	36,100	31,500	34,800	41,000
		Number Im F		18,300	6,200	17,100	19,400	14,600	28,600	32,800	6,500	18,700	21,400	18,400	17,300	26,300	24,900	31,500
		Number Total		105,500	31,300	79,600	92,000	66,000	127,300	144,200	51,200	94,300	153,600	94,500	114,700	130,900	98,700	107,800
		Percent		67.7	52.9	59.1	62.8	47.4	52.1	57.9	56.8	54.0	57.3	56.9	61.4	60.2	52.5	62.3
		Im:Ad		0.7	0.8	1.0	0.9	1.3	1.3	1.0	0.6	1.1	0.7	0.9	0.9	0.8	1.5	2.1
		M:F (Ad)		2.2	2.8	2.2	2.1	2.8	1.8	1.7	2.4	1.8	3.9	2.3	4.6	3.4	3.1	3.1
		M:F (Im)		1.5	1.3	1.3	1.3	1.6	1.5	1.2	2.0	1.6	2.1	1.5	2.1	1.2	1.4	1.3
	2	Number Ad M		3,600	1,700	2,700	5,400	3,400	11,400	10,700	6,900	5,400	12,800	6,400	6,400	8,500	6,600	5,100
		Number Ad F		2,200	800	1,600	2,700	1,600	7,000	4,200	3,200	2,200	4,600	3,000	2,300	2 600	3,400	2,600
		Number Im M		4,600	2,700	7,100	4,700	4,800	14,300	19,700	6,100	11,400	16,800	9,200	6,200	17,700	14,900	7,900
		Number Im F		4,100	2,400	5,600	4,300	4,100	8,400	8,100	4,900	7,100	8,700	5,800	4,100	11,300	12,000	9,200
		Number Total		14,500	7,600	17,000	17,200	14,000	41,200	42,700	21,100	26,100	42,900	24,400	19,000	40,100	36,900	24,800
		Percent		43.4	49.2	50.6	50.2	45.4	47.2	45.3	67.2	59.3	50.2	49.9	47.8	48.2	51.6	55.3
		Im:Ad		1.5	2.1	3.0	1.1	1.8	1.2	1.9	1.1	2.5	1.5	1.6	1.2	2.6	2.7	2.2
		M:F (Ad)		1.7	(2.1)	(1.7)	2.0	(2.2)	1.6	2.6	2.2	(2.4)	2.8	2.1	2.7	(3.3)	2.0	(2.0)
		M:F (Im)		1.1	1.2	1.3	1.1	1.2	1.7	2.4	1.2	1.6	1.9	1.6	1.5	1.6	1.2	0.9

	3	Number	Ad M		2,000	500	1,800	2,000	3,600	3,000	6,600	4,000	8,200	17,600	4,900	16,000	25,300	14,400	7,400
			Ad F		3,200	700	1,400	1,000	2,300	2,800	2,900	2,000	1,400	4,800	2,200	4,200	3,600	3,600	3,800
			Im M		2,300	400	1,500	1,000	3,400	2,700	7,600	3,100	5,900	15,900	4,400	11,600	11,800	10,800	18,400
			Im F		1,300	400	1,000	1,000	2,700	3,600	5,700	2,200	4,200	6,600	2,900	4,100	7,900	4,800	10,600
			Total		8,900	1,900	5,700	5,000	11,900	12,100	22,800	11,300	19,700	44,900	14,400	35,900	48,600	33,600	40,200
		Percent			(57.9)	(25.6)	36.8	39.8	33.9	31.9	57.5	46.5	48.2	50.0	45.3	48.0	69.3	44.1	53.0
		Im:Ad			0.7	(0.7)	(0.8)	0.7	1.0	1.1	1.4	0.9	1.0	1.0	1.0	0.8	0.7	0.9	2.6
		M:F (Ad)			(0.6)	(0.8)	(1.3)	(2.0)	(1.6)	(1.0)	2.2	2.0	(5.9)	3.7	2.2	3.8	7.1	4.0	2.0
		M:F (Im)			(1.8)	(1.1)	(1.5)	(1.0)	(1.2)	(0.7)	1.3	1.4	1.4	2.4	1.5	2.8	1.5	2.3	1.7
	Combined	Number	Ad M	45,100	47,200	14,700	32,000	40,000	28,100	50,400	61,500	33,300	43,100	100,300	45,100	72,800	90,200	50,500	39,100
			Ad F	24,300	24,200	5,900	15,400	19,000	11,400	30,200	33,600	14,600	19,600	27,400	20,100	17,600	22,900	16,500	15,100
			Im M	53,600	33,800	11,300	31,200	30,300	30,900	59,400	68,000	22,100	47,400	77,000	41,100	53,900	61,000	60,500	67,400
			Im F	40,600	23,700	8,900	23,600	24,800	21,500	40,600	46,600	13,600	30,100	36,700	27,000	25,400	45,500	41,700	51,200
			Total	163,600	128,900	40,800	102,300	114,200	91,900	180,600	209,700	83,600	140,200	241,300	133,300	169,700	219,600	169,200	172,800
		Percent		67.5	63.0	49.7	55.7	59.1	44.8	48.9	54.8	57.3	54.0	54.4	54.0	56.3	59.2	50.4	58.9
		Im:Ad		1.4	0.8	1.0	1.2	0.9	1.3	1.2	1.2	0.7	1.2	0.9	1.0	0.9	0.9	1.5	2.2
		M:F (Ad)		1.9	1.9	2.5	2.1	2.1	2.5	1.7	1.8	2.3	2.2	3.7	2.2	4.1	3.9	3.1	2.6
		M:F (Im)		1.3	1.4	1.3	1.3	1.2	1.4	1.5	1.5	1.6	1.6	2.1	1.5	2.1	1.3	1.5	1.3
Indiana	1	Number	Ad M	9,200	4,600	1,600	2,300	5,400	3,800	5,000	6,100	5,100	6,500	11,400	5,200	15,900	9,700	7,800	6,900
			Ad F	4,200	2,500	800	1,100	2,100	1,400	2,500	2,200	1,600	1,700	5,100	2,100	8,600	4,000	4,200	2,900
			Im M	8,100	3,600	1,300	2,700	4,000	3,600	6,300	6,900	4,600	6,200	9,600	4,900	19,800	11,400	11,900	15,000
			Im F	6,000	2,700	1,400	2,100	4,200	2,600	5,300	5,600	2,600	7,300	7,200	4,100	14,500	7,500	11,800	12,700
			Total	27,600	13,400	5,100	8,200	15,700	11,300	19,000	20,800	13,900	21,700	33,300	16,200	58,700	32,600	35,700	37,600
		Percent		59.9	53.2	36.9	49.0	42.7	35.7	42.7	42.3	34.4	32.4	38.2	39.4	48.6	40.6	48.9	41.5
		Im:Ad		1.0	0.9	1.1	1.4	1.1	1.2	1.5	1.5	1.1	1.6	1.0	1.2	1.4	1.4	2.0	2.8
		M:F (Ad)		2.2	1.9	2.1	2.0	2.6	2.7	2.0	2.8	3.1	(3.8)	2.2	2.5	1.9	2.4	1.9	2.4
		M:F (Im)		1.3	1.3	0.9	1.3	0.9	1.4	1.2	1.2	1.8	0.8	1.3	1.2	1.4	1.5	1.0	1.2
Ohio	1	Number	Ad M		1,000	800	2,300	2,600	2,600	3,000	3,300	1,900	2,700	4,500	2,500	2,300	3,100	4,500	2,200
			Ad F		1,100	400	1,300	1,200	1,000	1,800	2,100	1,400	2,200	3,200	1,600	1,900	1,900	2,200	2,800
			Im M		2,600	1,100	3,000	2,400	2,900	3,900	8,300	3,500	4,400	5,600	3,800	5,900	5,100	8,100	5,300
			Im F		2,600	1,200	2,000	2,300	2,500	3,000	5,800	2,500	5,200	5,600	3,300	5,100	4,600	6,100	3,800
			Total		7,300	3,500	8,700	8,500	8,900	11,800	19,600	9,300	14,500	18,900	11,100	15,200	14,600	20,800	14,000
		Percent			46.2	30.5	34.4	32.0	26.3	27.7	31.7	31.6	32.5	34.4	32.0	35.8	32.1	46.5	46.8
		Im:Ad			2.5	2.0	1.4	1.2	1.5	1.4	2.6	1.8	2.0	1.5	1.7	2.6	2.0	2.1	1.8
		M:F (Ad)			(0.9)	(2.0)	1.7	2.2	(2.7)	1.6	1.6	(1.4)	(1.2)	1.4	1.6	(1.2)	(1.6)	2.0	(0.8)
		M:F (Im)			1.0	0.9	1.5	1.0	1.1	1.3	1.4	1.4	0.8	1.0	1.2	1.1	1.1	1.3	1.4
	2	Number	Ad M		1,000	900	1,500	1,800	2,200	3,500	4,400	1,800	4,200	4,400	2,600	3,700	4,500	4,900	4,600
			Ad F		1,900	400	1,500	1,000	1,300	2,500	2,800	1,000	1,900	3,600	1,800	3,000	5,300	2,700	3,000
			Im M		3,900	2,200	3,800	3,600	4,100	7,800	7,700	3,700	7,000	8,600	5,200	6,400	8,000	10,300	9,500
			Im F		3,700	2,200	3,700	2,600	4,300	5,300	6,300	2,900	6,400	6,900	4,400	6,200	6,400	8,600	6,900
			Total		10,500	5,700	10,500	9,000	11,900	19,100	21,100	9,300	19,500	23,500	14,000	19,300	24,200	26,400	24,000
		Percent			29.9	19.4	25.9	24.8	19.8	29.3	30.7	18.1	26.9	25.5	25.4	27.1	27.7	35.6	29.2
		Im:Ad			2.7	3.3	2.5	2.3	2.4	2.2	1.9	2.4	2.2	1.9	2.2	1.9	1.5	2.5	2.2
		M:F (Ad)			(0.5)	(2.2)	1.0	1.9	1.7	1.4	1.6	(1.8)	2.2	1.2	1.4	1.2	0.9	1.8	1.5
		M:F (Im)			1.0	1.0	1.1	1.4	1.0	1.5	1.2	1.3	1.1	1.2	1.2	1.0	1.3	1.2	1.4
	Combined	Number	Ad M	6,900	2,000	1,700	3,800	4,400	4,800	6,500	7,700	3,700	6,900	8,900	5,000	6,000	7,600	9,400	6,800
			Ad F	4,800	3,000	800	2,800	2,100	2,300	4,400	4,900	2,400	4,100	6,800	3,400	4,900	7,100	4,900	5,800
			Im M	15,000	6,500	3,300	6,800	6,000	6,900	11,700	16,000	7,100	11,400	14,200	9,000	12,300	13,100	18,400	14,800
			Im F	12,700	6,300	3,400	5,700	4,900	6,800	8,300	12,000	5,400	11,600	12,500	7,700	11,300	11,000	14,700	10,600
			Total	39,300	17,700	9,200	19,200	17,500	20,900	30,900	40,700	18,600	34,000	42,400	25,100	34,500	38,800	47,300	38,000
		Percent		32.1	34.9	22.5	29.2	27.9	22.1	28.7	31.2	23.0	29.1	28.9	28.0	30.4	29.2	39.7	33.9
		Im:Ad		2.4	2.6	2.7	1.9	1.7	1.9	1.8	2.2	2.1	2.1	1.7	2.0	2.2	1.6	2.3	2.0
		M:F (Ad)		1.4	0.7	2.1	1.3	2.1	2.1	1.5	1.6	1.6	1.7	1.3	1.5	1.2	1.1	1.9	1.2
		M:F (Im)		1.2	1.0	1.0	1.2	1.2	1.0	1.4	1.3	1.3	1.0	1.1	1.2	1.1	1.2	1.3	1.4
Missouri	1	Number	Ad M		14,200	2,400	2,600	8,600	6,100	6,900	13,900	6,600	12,700	13,300	8,700	11,600	19,100	13,400	15,000
			Ad F		5,200	500	1,500	2,900	1,500	3,100	5,800	2,700	5,200	4,900	3,300	6,600	7,000	4,600	2,700
			Im M		9,100	1,800	3,900	6,600	6,000	7,700	15,200	4,900	15,000	13,400	8,400	14,600	13,100	10,700	21,600
			Im F		7,200	800	3,500	5,300	4,400	5,000	10,100	3,300	12,800	9,200	6,200	7,500	6,400	5,800	10,300
			Total		35,700	5,500	11,400	23,400	18,000	22,700	44,900	17,600	45,700	40,800	26,600	40,200	45,600	34,500	49,500
		Percent			64.8	44.8	43.9	53.0	38.1	59.7	49.5	55.7	61.2	41.4	51.2	56.4	66.8	61.7	66.2
		Im:Ad			0.8	0.9	1.8	1.0	1.4	1.3	1.3	0.9	1.6	1.2	1.2	1.2	0.7	0.9	1.8
		M:F (Ad)			2.8	4.5	1.7	3.0	4.0	2.2	2.4	2.4	2.4	2.7	2.6	1.8	2.7	2.9	5.6
		M:F (Im)			1.3	(2.4)	1.1	1.2	1.4	1.6	1.5	1.5	1.2	1.5	1.4	2.0	2.1	1.8	2.1

Table A-11.--continued. Size, age, and sex characteristics of the annual mallard harvest by harvest area and State of harvest, 1960-1974. (All mallard bloodlines and all U. S. waterfowl seasons included; Ad = adult, Im = immature, M = male, F = female.)

State and Flyway	Harvest area	Parameter estimated	Hunting Season 1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1961-1970 Average	1971-72	1972-73	1973-74	1974-75
Mississippi Flyway																		
Missouri	2	Number Ad M		11,100	2,200	3,300	7,500	4,700	5,300	10,000	8,600	6,900	11,600	7,100	13,500	12,000	9,200	8,600
		Number Ad F		4,400	1,200	2,200	3,300	2,200	4,900	4,500	3,000	3,800	5,000	3,400	7,200	6,700	2,100	3,000
		Number Im M		11,100	1,300	2,100	5,700	3,300	7,300	9,800	4,600	8,700	8,300	6,200	9,400	3,900	5,800	11,400
		Number Im F		8,200	1,300	2,400	4,200	4,100	9,500	6,000	3,500	8,600	6,200	5,400	7,700	4,300	4,800	9,000
		Number Total		34,800	5,900	10,100	20,800	14,300	27,000	30,400	19,700	28,000	31,100	22,200	37,800	27,000	22,000	32,000
		Percent		68.6	58.9	50.3	61.3	37.0	50.1	57.9	49.7	49.1	44.3	52.1	58.7	56.7	56.5	55.0
		Im:Ad		1.2	0.8	0.8	0.9	1.1	1.7	1.1	0.7	1.6	0.9	1.1	0.8	0.4	0.9	1.7
		M:F (Ad)		2.5	1.9	1.5	2.3	2.1	1.1	2.2	2.9	1.8	2.3	2.1	1.9	1.8	4.5	(2.9)
		M:F (Im)		1.4	1.0	0.9	1.4	0.8	0.8	1.6	1.3	1.0	1.4	1.2	1.2	0.9	1.2	1.3
	3	Number Ad M		2,800	600	2,000	5,300	4,400	5,500	13,600	6,900	8,500	21,900	7,200	21,300	15,700	16,800	22,500
		Number Ad F		900	200	500	1,100	1,700	1,400	3,600	3,400	4,900	6,600	2,400	7,400	4,700	3,600	5,300
		Number Im M		500	200	1,100	3,300	4,400	5,600	10,700	2,400	13,600	13,400	5,500	11,800	6,600	9,000	16,100
		Number Im F		500	200	600	2,100	2,000	3,300	7,800	2,000	4,100	9,100	3,200	10,100	5,500	5,400	9,200
		Number Total		4,700	1,300	4,300	11,800	12,400	15,700	35,600	14,700	31,000	51,000	18,300	50,500	32,500	34,800	53,100
		Percent		(46.7)	(85.1)	56.5	54.3	49.9	54.5	51.9	60.1	62.5	53.5	54.9	59.4	62.5	68.2	67.5
		Im:Ad		(0.3)	(0.6)	0.7	0.8	1.0	1.3	1.1	0.4	1.3	0.8	0.9	0.8	0.6	0.7	0.9
		M:F (Ad)		(3.3)	(3.4)	(4.1)	4.8	2.6	(4.0)	3.8	2.0	1.7	3.3	3.0	2.9	3.3	4.6	4.2
		M:F (Im)		(1.2)	(1.1)	(1.7)	1.6	2.2	1.7	1.4	1.2	3.3	1.5	1.7	1.2	1.2	1.7	1.8
	4	Number Ad M		3,100	800	1,300	1,600	2,200	6,500	6,600	1,300	6,700	9,300	3,900	9,200	10,400	8,100	8,500
		Number Ad F		1,300	100	900	600	400	2,500	2,500	700	1,400	6,300	1,700	7,500	9,300	2,800	1,700
		Number Im M		1,200	300	700	700	1,200	5,100	2,200	600	8,400	7,000	2,700	9,700	3,100	3,100	11,000
		Number Im F		1,000	100	800	700	1,100	2,900	3,200	500	3,600	4,400	1,800	7,000	2,600	2,900	8,900
		Number Total		6,600	1,200	3,700	3,500	4,900	16,900	14,500	3,100	20,100	27,000	10,100	33,300	25,400	16,800	30,200
		Percent		(74.3)	(53.0)	54.4	59.0	33.3	42.5	52.6	30.1	56.4	59.8	51.5	73.4	57.5	64.6	71.4
		Im:Ad		0.5	(0.4)	0.7	0.6	0.9	0.9	0.6	(0.5)	1.5	0.7	0.8	1.0	0.3	0.5	1.9
		M:F (Ad)		(2.3)	(13.4)	1.4	(2.8)	(5.8)	(2.6)	(2.6)	(1.7)	(4.8)	(1.5)	2.4	1.2	1.1	2.9	(4.9)
		M:F (Im)		(1.2)	(5.1)	0.8	(1.0)	(1.1)	(1.8)	(0.7)	(1.0)	(2.3)	(1.6)	1.5	1.4	(1.2)	(1.1)	1.2
	Combined	Number Ad M	42,400	31,200	6,000	9,200	23,000	17,300	24,100	44,100	23,400	34,900	56,100	26,900	55,600	57,200	47,500	54,700
		Number Ad F	20,200	11,700	1,900	5,200	7,900	5,800	11,800	16,300	9,900	15,300	22,800	10,900	28,600	27,700	13,100	12,700
		Number Im M	43,400	21,900	3,600	7,700	16,200	14,900	25,700	37,900	12,500	45,600	42,200	22,800	45,400	26,800	28,600	60,100
		Number Im F	33,500	16,900	2,300	7,400	12,300	11,600	20,700	27,100	9,300	29,100	28,900	16,500	32,300	18,800	18,900	37,300
		Number Total	139,600	81,700	13,900	29,500	59,400	49,600	82,300	125,500	55,100	124,900	150,000	77,200	161,900	130,500	108,100	164,800
		Percent	79.6	65.6	53.3	48.8	56.2	39.5	51.3	52.4	52.0	57.5	48.5	52.3	60.8	61.5	62.9	64.9
		Im:Ad	1.2	0.9	0.7	1.1	0.9	1.2	1.3	1.1	0.7	1.5	0.9	1.0	0.9	0.5	0.8	1.4
		M:F (Ad)	2.1	2.7	3.1	1.8	2.9	3.0	2.0	2.7	2.4	2.3	2.5	2.5	1.9	2.1	3.6	4.3
		M:F (Im)	1.3	1.3	1.6	1.1	1.3	1.3	1.2	1.4	1.3	1.6	1.5	1.4	1.4	1.4	1.5	1.6
Kentucky	1	Number Ad M		5,800	1,100	2,200	8,100	4,100	6,700	8,100	2,300	1,600	9,800	5,000	9,400	8,700	3,400	5,600
		Number Ad F		1,000	300	900	1,900	1,200	1,700	3,200	900	400	3,500	1,500	4,400	5,300	1,200	1,800
		Number Im M		2,100	800	2,100	3,400	4,200	2,900	4,500	1,400	3,100	7,300	3,200	5,300	9,000	4,600	8,900
		Number Im F		1,000	300	1,500	2,000	2,300	2,600	2,800	1,500	2,800	4,700	2,200	3,900	5,500	4,500	4,600
		Number Total		9,900	2,500	6,600	15,400	11,800	13,900	18,600	6,100	7,900	25,200	11,800	23,000	28,400	13,700	21,000
		Percent		78.3	59.7	65.0	73.7	68.8	65.9	67.6	57.1	68.6	67.0	68.0	74.2	74.5	62.5	67.3
		Im:Ad		0.5	0.8	1.2	0.5	1.2	0.7	0.6	0.9	3.0	0.9	0.8	0.7	1.0	2.0	1.8
		M:F (Ad)		5.6	3.3	2.6	4.2	3.5	3.9	2.6	(2.5)	(4.0)	2.8	3.3	2.1	1.6	(2.9)	3.1
		M:F (Im)		2.1	2.2	1.4	1.7	1.8	1.1	1.6	(1.0)	1.1	1.6	1.5	1.4	1.6	1.0	1.9
	2	Number Ad M		1,000	500	500	1,400	700	1,500	1,300	700	800	3,300	1,200	1,500	4,700	2,500	2,100
		Number Ad F		500	200	200	500	700	600	400	400	200	1,100	500	800	1,800	800	300
		Number Im M		5,500	300	600	1,000	700	900	1,000	1,000	300	2,800	1,400	1,900	3,200	2,700	3,900
		Number Im F		600	300	400	500	400	800	1,100	200	500	2,700	700	500	1,700	1,800	2,800
		Number Total		7,600	1,200	1,600	3,400	2,500	3,800	3,800	2,300	1,800	9,900	3,800	4,800	11,400	7,700	9,000
		Percent		71.0	50.4	53.0	53.8	51.6	52.9	46.2	45.0	(46.3)	50.5	53.2	51.8	60.7	54.9	58.9
		Im:Ad		4.1	0.9	1.5	0.8	0.8	0.8	1.2	1.1	(0.9)	1.2	1.3	1.0	0.7	1.4	2.8
		M:F (Ad)		(2.3)	(2.8)	(2.2)	2.6	(1.1)	(2.4)	(3.4)	(1.9)	(4.1)	(3.1)	2.5	(1.8)	2.6	3.1	(6.3)
		M:F (Im)		9.8	(1.2)	(1.7)	(2.2)	(1.7)	(1.1)	(0.9)	(5.1)	(0.6)	(1.0)	1.9	(4.0)	(1.9)	1.4	1.4

Combined	Number	Ad M	5,900	6,800	1,600	2,700	9,500	4,800	8,100	9,500	3,000	2,300	13,100	6,100	10,900	13,300	5,900	7,700
		Ad F	2,000	1,500	500	1,100	2,500	1,800	2,300	3,600	1,300	600	4,600	2,000	5,200	7,100	2,000	2,200
		Im M	4,100	7,700	1,100	2,700	4,500	4,900	3,800	5,500	2,400	3,400	10,000	4,600	7,200	12,200	7,300	12,800
		Im F	3,600	1,600	600	1,900	2,500	2,700	3,400	3,900	1,700	3,400	7,300	2,900	4,400	7,200	6,400	7,400
		Total	15,600	17,600	3,800	8,300	18,900	14,200	17,700	22,400	8,400	9,600	35,100	15,600	27,800	39,800	21,500	30,000
	Percent		66.2	75.0	56.4	62.2	69.1	65.0	62.6	62.7	53.1	63.0	61.4	63.7	69.1	70.0	59.5	64.5
	Im:Ad		1.0	1.1	0.8	1.2	0.6	1.1	0.7	0.7	1.0	2.3	1.0	0.9	0.7	0.9	1.7	2.1
	M:F (Ad)		3.0	4.6	3.1	2.5	3.9	2.6	3.5	2.7	2.3	(4.0)	2.8	3.1	2.1	1.9	3.0	3.6
	M:F (Im)		1.1	4.9	1.8	1.4	1.8	1.8	1.1	1.4	1.5	1.0	1.4	1.6	1.6	1.7	1.1	1.7
Arkansas 1	Number	Ad M		1,700	2,100	9,600	12,300	4,700	8,100	12,200	5,800	13,200	42,100	11,200	38,200	30,800	35,500	27,000
		Ad F		400	700	4,000	4,500	1,500	3,300	3,200	3,700	4,400	13,800	4,000	17,600	13,900	13,400	8,000
		Im M		1,600	1,100	5,000	7,300	3,600	2,300	3,700	2,600	9,800	15,900	5,300	17,200	16,200	22,200	24,500
		Im F		500	900	4,800	5,700	3,200	3,800	6,400	1,500	5,700	13,600	4,600	9,200	8,700	16,500	13,800
		Total		4,200	4,700	23,400	29,900	13,000	17,400	25,400	13,700	33,100	85,500	25,000	82,200	69,600	87,600	73,300
	Percent			(55.8)	75.7	71.2	68.0	43.9	55.5	52.1	47.4	72.3	72.6	63.7	70.2	71.8	67.2	74.0
	Im:Ad			(1.0)	0.7	0.7	0.8	1.1	0.5	0.7	0.4	0.9	0.5	0.7	0.5	0.6	0.8	1.1
	M:F (Ad)			(4.4)	3.1	2.4	2.7	(3.2)	2.4	3.9	(1.5)	(3.0)	3.0	2.8	2.2	2.2	2.7	3.4
	M:F (Im)			(3.4)	1.2	1.0	1.3	(1.1)	(0.6)	(0.6)	(1.7)	(1.7)	1.2	1.1	1.9	1.9	1.3	1.8
2	Number	Ad M		9,900	4,400	8,100	35,500	18,100	32,600	27,200	10,000	9,400	62,400	21,800	52,200	38,100	36,100	48,000
		Ad F		3,900	1,300	3,300	13,300	6,000	16,700	17,000	3,000	3,000	27,400	9,500	21,000	15,200	19,400	11,300
		Im M		3,300	3,100	6,200	26,500	12,300	26,500	28,000	2,900	23,900	62,900	19,600	29,400	15,400	19,500	60,600
		Im F		2,200	1,900	4,400	18,400	13,400	16,800	19,600	2,000	16,700	46,400	14,200	30,100	14,600	21,900	23,300
		Total		19,300	10,700	22,000	93,700	49,700	92,700	91,800	18,000	53,100	199,200	65,000	132,700	83,300	96,900	143,200
	Percent			94.5	83.9	75.4	81.6	76.3	75.1	74.7	(92.6)	86.8	88.7	81.9	86.3	86.1	83.2	79.3
	Im:Ad			0.4	0.9	0.9	0.9	1.1	0.9	1.1	0.4	3.3	1.2	1.1	0.8	0.6	0.7	1.4
	M:F (Ad)			2.5	3.5	2.5	2.7	3.0	1.9	1.6	3.3	(3.1)	2.3	2.3	2.5	2.5	1.9	4.2
	M:F (Im)			1.5	1.6	1.4	1.4	0.9	1.6	1.4	(1.4)	1.4	1.4	1.4	1.0	1.1	0.9	2.6
3	Number	Ad M		17,300	10,500	16,100	43,100	25,200	50,100	56,700	46,900	33,500	106,700	40,600	124,100	51,400	75,100	98,000
		Ad F		5,400	2,200	6,800	15,700	5,600	14,400	21,900	11,900	10,900	32,900	12,800	48,800	16,000	21,100	25,900
		Im M		8,400	4,600	8,300	16,700	19,700	27,100	31,800	15,100	23,100	42,300	19,700	39,900	16,000	30,200	87,400
		Im F		3,200	2,700	6,300	13,700	14,100	26,100	22,600	7,600	18,700	29,200	14,400	21,300	15,700	24,600	52,800
		Total		34,300	20,000	37,500	89,100	64,700	117,700	133,000	81,500	86,200	211,100	87,500	234,100	99,100	151,000	264,100
	Percent			96.8	81.2	66.6	78.0	69.8	71.7	81.0	88.7	74.4	83.8	78.7	85.7	72.6	65.7	75.8
	Im:Ad			0.5	0.6	0.6	0.5	1.1	0.8	0.7	0.4	0.9	0.5	0.6	0.4	0.5	0.6	1.1
	M:F (Ad)			3.2	4.8	2.3	2.7	4.5	3.5	2.6	3.9	3.1	3.2	3.2	2.5	3.2	3.6	3.8
	M:F (Im)			2.6	1.7	1.3	1.2	1.4	1.0	1.4	2.0	1.2	1.4	1.4	1.9	1.0	1.2	1.7
4	Number	Ad M		3,200	3,200	4,100	10,900	4,300	13,400	8,500	4,300	3,700	14,800	7,000	25,400	16,200	8,600	17,500
		Ad F		300	700	1,500	2,400	1,500	3,100	2,400	2,100	900	11,300	2,600	16,100	5,500	1,100	6,700
		Im M		1,000	900	3,100	4,700	1,900	6,300	6,700	1,100	2,700	9,900	3,800	11,600	5,500	2,100	17,200
		Im F		400	1,000	2,200	3,300	2,800	6,900	3,800	1,200	3,600	9,700	3,500	12,300	3,900	2,600	8,800
		Total		4,900	5,800	11,000	21,300	10,400	29,600	21,400	8,800	10,900	45,800	17,000	65,400	31,100	14,400	50,200
	Percent			(89.9)	61.2	54.9	64.0	35.9	52.7	56.8	(65.2)	(84.3)	70.2	60.1	88.0	74.6	69.6	80.4
	Im:Ad			(0.4)	0.5	0.9	0.6	0.8	0.8	1.0	0.4	(1.4)	0.8	0.8	0.6	0.4	(0.5)	1.1
	M:F (Ad)			(10.5)	4.6	2.7	4.6	(2.9)	4.3	(3.6)	(2.1)	(4.0)	1.3	2.7	1.6	2.9	(7.6)	2.6
	M:F (Im)			(2.6)	(0.9)	1.4	1.4	(0.7)	0.9	(1.7)	(0.9)	(0.8)	1.0	1.1	0.9	(1.4)	(0.8)	1.9
Combined	Number	Ad M	96,900	32,000	20,100	38,000	101,900	52,300	104,100	104,600	67,000	59,700	226,100	80,600	239,900	136,400	155,300	190,500
		Ad F	39,800	10,000	4,800	15,600	35,900	14,600	37,500	44,500	20,700	19,300	85,300	28,800	103,400	50,700	55,000	52,000
		Im M	93,900	14,400	9,700	22,600	55,200	37,500	62,200	70,200	21,800	59,500	131,000	48,400	98,100	53,100	73,900	189,600
		Im F	83,800	6,300	6,600	17,700	41,100	33,500	53,600	52,400	12,300	44,700	99,000	36,700	73,000	42,900	65,800	98,700
		Total	314,200	62,600	41,200	93,900	234,100	137,800	257,500	271,600	121,800	183,200	541,500	194,500	514,400	283,100	349,900	530,800
	Percent		90.6	91.1	77.6	67.9	76.4	63.7	68.6	72.7	79.4	77.7	82.1	75.4	83.2	76.2	70.3	76.9
	Im:Ad		1.3	0.5	0.7	0.8	0.7	1.1	0.8	0.8	0.4	1.3	0.7	0.8	0.5	0.5	0.7	1.2
	M:F (Ad)		2.4	3.2	4.2	2.4	2.8	3.6	2.8	2.3	3.2	3.1	2.7	2.8	2.3	2.7	2.8	3.7
	M:F (Im)		1.1	2.3	1.5	1.3	1.3	1.1	1.2	1.3	1.8	1.3	1.3	1.3	1.3	1.2	1.1	1.9
Tennessee 1	Number	Ad M		11,800	1,300	7,200	21,000	8,300	19,200	15,500	10,500	8,700	22,100	12,600	32,700	25,300	42,500	24,700
		Ad F		4,800	600	4,000	7,600	2,500	6,700	5,100	3,100	3,800	11,200	4,900	16,300	8,300	10,100	6,700
		Im M		5,100	700	6,500	11,400	6,600	12,300	8,000	6,400	5,500	21,300	8,400	19,600	15,700	40,600	19,600
		Im F		3,600	500	3,600	7,200	3,900	11,700	7,800	4,400	3,200	13,700	6,000	16,900	7,600	14,200	13,000
		Total		25,400	3,000	21,300	47,300	21,300	49,900	36,400	24,400	21,100	68,300	31,800	85,500	56,900	107,400	64,000
	Percent			80.7	68.6	50.3	70.5	53.5	60.7	64.6	58.7	64.6	60.9	62.4	61.8	62.8	69.7	72.1
	Im:Ad			0.5	0.6	0.9	0.7	1.0	0.9	0.8	0.8	0.7	1.1	0.8	0.7	0.7	1.0	1.0
	M:F (Ad)			2.5	2.1	1.8	2.7	3.4	2.8	3.0	3.4	2.3	2.0	2.5	2.0	3.1	4.2	3.7
	M:F (Im)			1.4	1.4	1.8	1.6	1.7	1.1	1.0	1.5	1.7	1.5	1.4	1.2	2.1	2.9	1.5

Table A-11.--continued. Size, age, and sex characteristics of the annual mallard harvest by harvest area and State of harvest, 1960-1974. (All mallard bloodlines and all U. S. waterfowl seasons included; Ad = adult, Im = immature, M = male, F = female.)

State and Flyway	Harvest area		Parameter estimated	Hunting Season 1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1961-1970 Average	1971-72	1972-73	1973-74	1974-75
Mississippi Flyway																			
Tennessee	2	Number	Ad M		2,900	1,400	2,900	5,200	1,900	3,200	3,900	2,100	1,400	7,100	3,200	5,300	7,800	5,300	4,600
			Ad F		1,300	400	1,100	2,600	900	1,500	1,700	1,000	2,200	4,200	1,700	3,600	5,300	2,600	2,300
			Im M		1,700	1,700	3,100	4,100	1,800	3,000	4,500	2,700	4,400	7,300	3,400	6,500	6,600	8,200	7,400
			Im F		1,500	900	2,300	2,700	2,000	4,200	3,600	1,000	2,900	4,700	2,600	4,900	5,500	4,600	6,900
			Total		7,300	4,400	9,400	14,600	6,500	11,800	13,700	6,900	10,900	23,300	10,900	20,300	25,200	20,700	21,100
		Percent			45.0	41.9	34.0	49.9	37.2	37.8	32.2	48.0	(47.9)	50.1	42.1	47.7	49.6	46.1	39.9
		Im:Ad			0.8	1.4	1.4	0.9	1.4	1.5	1.4	1.2	(2.0)	1.1	1.2	1.3	0.9	1.6	2.1
		M:F (Ad)			2.3	(3.5)	2.7	2.0	2.2	2.1	(2.2)	(2.1)	(0.7)	1.7	1.9	1.5	1.5	2.0	(2.0)
		M:F (Im)			(1.1)	1.9	1.3	1.5	0.9	0.7	1.3	(2.7)	(1.5)	1.5	1.3	1.3	1.2	1.8	1.1
	Combined	Number	Ad M	18,700	14,700	2,700	10,100	26,200	10,200	22,400	19,400	12,600	10,100	29,200	15,700	38,000	33,100	47,700	29,300
			Ad F	8,000	6,100	1,000	5,100	10,200	3,300	8,200	6,800	4,100	5,900	15,400	6,600	19,800	13,600	12,700	8,900
			Im M	15,000	6,800	2,300	9,600	15,500	8,300	15,300	12,500	9,200	9,900	28,600	11,800	26,100	22,300	48,800	27,000
			Im F	14,400	5,100	1,400	5,900	10,000	6,000	15,900	11,400	5,400	6,100	18,500	8,600	21,800	13,100	18,900	19,900
			Total	56,200	32,700	7,400	30,700	61,900	27,800	61,800	50,100	31,300	32,000	91,600	42,700	105,800	82,100	128,100	85,100
		Percent		66.9	68.5	49.8	43.9	64.2	48.5	54.4	50.7	56.0	57.8	57.7	55.6	58.5	58.1	64.4	60.1
		Im:Ad		1.1	0.6	1.0	1.0	0.7	1.1	1.0	0.9	0.9	1.0	1.1	0.9	0.8	0.8	1.1	1.2
		M:F (Ad)		2.3	2.4	2.7	2.0	2.6	3.1	2.7	2.8	3.1	1.7	1.9	2.4	1.9	2.4	3.8	3.3
		M:F (Im)		1.0	1.3	1.7	1.6	1.6	1.4	1.0	1.1	1.7	1.6	1.5	1.4	1.2	1.7	2.6	1.4
Louisiana	1	Number	Ad M		1,700	6,800	17,500	13,400	8,700	5,600	7,300	10,200	13,000	38,300	12,300	26,700	27,800	21,100	27,300
			Ad F		2,500	4,000	12,200	7,100	4,600	4,900	6,800	4,600	6,000	19,200	7,200	15,200	13,600	10,500	3,700
			Im M		0	3,300	10,200	9,300	11,200	21,100	10,100	3,000	11,500	20,900	10,100	16,100	7,300	16,100	25,800
			Im F		1,400	3,300	12,700	10,900	10,900	11,900	7,100	2,100	8,000	17,400	8,600	18,700	10,300	7,800	11,400
			Total		5,600	17,500	52,600	40,600	35,500	43,500	31,300	19,900	38,500	95,900	38,100	76,700	59,000	55,500	68,200
		Percent			15.9	36.6	40.8	29.6	25.1	23.4	23.0	30.7	20.9	35.7	28.6	37.7	35.5	24.5	33.7
		Im:Ad			(0.3)	0.6	0.8	1.0	1.7	3.2	1.2	0.3	1.0	0.7	1.0	0.8	0.4	0.8	1.2
		M:F (Ad)			(0.7)	1.7	1.4	1.9	(1.9)	(1.1)	(1.1)	2.2	(2.2)	2.0	1.7	1.8	2.0	2.0	7.5
		M:F (Im)			(0.0)	1.0	0.8	0.9	1.0	1.8	(1.4)	(1.4)	(1.4)	1.2	1.2	0.9	(0.7)	2.1	2.3
	2	Number	Ad M		12,000	8,500	26,700	43,900	17,500	36,600	24,200	17,400	24,600	64,800	27,600	29,300	26,700	16,600	25,400
			Ad F		6,100	3,700	14,700	22,000	8,700	22,800	13,500	5,400	9,700	54,900	16,200	17,300	19,400	3,800	12,600
			Im M		500	5,500	19,500	21,900	21,500	39,000	28,700	11,700	28,500	81,100	25,800	22,400	13,800	7,700	22,900
			Im F		3,700	4,600	21,600	28,500	17,300	50,100	31,700	7,500	23,400	63,000	25,100	33,000	15,800	6,800	30,000
			Total		22,200	22,300	82,500	116,400	65,100	148,500	98,100	42,000	86,200	263,800	94,700	102,100	75,700	34,900	91,500
		Percent			24.1	32.5	30.3	29.4	19.1	21.9	19.0	17.4	22.0	25.6	23.5	21.2	11.7	6.9	18.4
		Im:Ad			0.2	0.8	1.0	0.8	1.5	1.5	1.6	0.8	1.5	1.2	1.2	1.2	0.6	0.7	1.4
		M:F (Ad)			2.0	2.3	1.8	2.0	2.0	1.6	1.8	3.2	(2.5)	1.2	1.7	1.7	1.4	(4.4)	2.0
		M:F (Im)			(0.1)	1.2	0.9	0.8	1.2	0.8	0.9	(1.6)	1.2	1.3	1.0	0.7	0.9	(1.1)	0.7
	3	Number	Ad M		3,600	6,300	16,100	25,000	12,700	24,700	24,000	20,000	29,000	41,400	20,300	25,700	30,300	18,000	12,000
			Ad F		2,100	3,100	5,900	8,600	6,500	8,300	8,900	8,300	14,100	19,200	8,500	11,600	9,300	6,900	3,100
			Im M		300	2,700	10,700	9,600	14,200	23,300	18,100	6,300	36,700	41,300	16,300	9,100	9,100	5,700	10,600
			Im F		1,500	2,400	9,600	9,500	12,400	24,700	25,000	5,300	26,400	37,800	15,500	15,100	8,100	5,700	8,700
			Total		7,600	14,500	42,200	52,700	45,800	80,900	76,000	40,000	106,200	139,800	60,600	61,500	56,900	36,400	34,400
		Percent			9.2	18.6	16.0	14.7	8.5	16.0	16.6	18.6	20.9	19.5	16.3	14.0	16.4	7.0	7.4
		Im:Ad			0.3	0.5	0.9	0.6	1.4	1.5	1.3	0.4	1.5	1.3	1.1	0.6	0.4	0.5	1.3
		M:F (Ad)			(1.7)	2.0	2.7	2.9	1.9	3.0	(2.7)	2.4	2.1	2.2	2.4	2.2	3.2	2.6	(3.8)
		M:F (Im)			(0.2)	1.1	1.1	1.0	1.1	0.9	0.7	(1.2)	1.4	1.1	1.1	0.6	(1.1)	(1.0)	1.2
	Combined	Number	Ad M	34,200	17,300	21,600	60,300	82,300	38,900	66,900	55,500	47,700	66,600	144,600	60,200	81,800	84,800	55,700	64,700
			Ad F	28,800	10,800	10,900	32,700	37,700	19,900	35,900	29,200	18,300	29,300	93,400	31,900	44,100	42,400	21,100	19,400
			Im M	35,000	800	11,500	40,300	40,800	46,900	83,400	56,900	21,000	76,700	143,300	52,200	47,600	30,200	29,600	59,300
			Im F	42,400	6,600	10,300	43,900	48,900	40,600	86,700	63,800	14,900	57,800	118,200	49,200	66,800	34,200	20,300	50,700
			Total	140,400	35,500	54,300	177,300	209,700	146,400	272,900	205,400	101,900	230,900	499,500	193,400	240,300	191,600	126,800	194,100
		Percent		40.0	16.8	27.9	26.6	23.5	14.4	20.0	18.5	19.6	21.3	24.8	21.3	21.4	16.5	10.1	16.7
		Im:Ad		1.2	0.3	0.7	0.9	0.7	1.5	1.7	1.4	0.5	1.4	1.1	1.1	0.9	0.5	0.6	1.3
		M:F (Ad)		1.2	1.6	2.0	1.8	2.2	2.0	1.9	1.9	2.6	2.2	1.5	1.9	1.9	2.0	2.6	3.3
		M:F (Im)		0.8	0.1	1.1	0.9	0.8	1.2	1.0	0.9	1.4	1.3	1.2	1.1	0.7	0.9	1.5	1.2

Miss.	1	Number	Ad M		2,900	2,700	6,400	7,800	3,300	8,300	8,000	5,900	13,100	38,900	9,700	35,100	30,300	23,100	24,300
			Ad F		1,000	1,300	3,500	3,100	400	4,200	3,800	1,800	2,500	12,800	3,400	10,600	10,000	8,300	9,400
			Im M		1,300	1,800	3,500	2,800	2,100	4,800	8,100	3,700	10,700	21,500	6,000	8,800	7,300	11,800	13,600
			Im F		900	1,000	2,600	3,400	1,300	4,700	5,800	4,100	8,700	15,800	4,800	6,700	7,400	6,300	9,300
			Total		6,000	6,800	16,100	17,200	7,100	22,000	25,800	15,400	35,000	89,000	24,000	61,300	54,900	49,400	56,700
		Percent			(78.3)	66.4	54.7	63.4	36.0	48.6	58.7	56.8	39.2	75.4	57.5	69.7	65.6	65.1	63.4
		Im:Ad			0.6	0.7	0.6	0.6	0.9	0.8	1.2	1.0	1.2	0.7	0.8	0.3	0.4	0.6	0.7
		M:F (Ad)			(2.8)	2.1	1.8	2.5	(9.3)	2.0	(2.1)	3.3	(5.2)	3.0	2.8	3.3	3.0	2.8	2.6
		M:F (Im)			(1.5)	(1.8)	1.4	0.8	(1.7)	1.0	1.4	0.9	(1.2)	1.4	1.2	1.3	1.0	1.9	1.5
	2	Number	Ad M		2,100	2,700	8,000	7,200	3,500	7,600	6,600	11,700	10,500	20,800	8,000	11,800	12,400	15,500	42,600
			Ad F		1,100	700	3,100	2,800	1,300	5,000	4,200	4,600	4,000	7,300	3,400	6,700	5,500	4,700	11,900
			Im M		1,400	1,700	5,000	2,700	3,700	4,500	3,700	4,000	9,900	10,000	4,700	6,100	3,100	7,300	22,600
			Im F		1,000	1,500	4,200	2,900	3,100	6,800	4,500	3,200	7,500	12,300	4,700	4,600	3,700	5,400	13,200
			Total		5,600	6,600	20,300	15,600	11,600	23,300	19,000	23,500	32,000	50,400	20,800	29,100	24,700	32,900	90,300
		Percent			37.2	34.9	35.5	37.1	22.7	38.0	27.4	47.9	47.3	47.2	38.6	41.8	36.3	41.6	59.3
		Im:Ad			0.7	0.9	0.8	0.6	1.4	0.9	0.8	0.4	1.2	0.8	0.8	0.6	0.4	0.6	0.7
		M:F (Ad)			(1.8)	3.7	2.6	2.6	(2.7)	1.4	(1.6)	2.5	(2.6)	2.8	2.3	1.8	2.3	3.3	3.6
		M:F (Im)			(1.5)	1.1	1.2	0.9	(1.2)	0.7	(0.8)	(1.2)	(1.3)	0.8	1.0	1.3	(0.8)	1.4	1.7
	Combined	Number	Ad M	13,500	4,900	5,400	14,500	15,000	6,800	15,400	14,600	17,600	23,600	59,700	17,700	46,900	42,700	38,600	66,900
			Ad F	6,600	2,100	2,000	6,600	5,900	1,700	9,300	8,000	6,400	6,500	20,200	6,900	17,300	15,500	13,000	21,300
			Im M	8,300	2,700	3,500	8,500	5,500	5,800	9,200	11,800	7,700	20,600	31,500	10,700	14,900	10,400	19,100	36,300
			Im F	9,800	1,800	2,500	6,800	6,400	4,300	11,500	10,300	7,300	16,200	28,100	9,500	11,300	11,200	11,600	22,500
			Total	38,100	11,600	13,400	36,400	32,800	18,600	45,400	44,800	38,900	67,000	139,400	44,800	90,400	79,700	82,300	147,000
		Percent		72.2	51.1	46.0	42.1	47.4	26.4	42.5	39.6	51.0	42.7	62.0	46.9	57.3	52.4	53.1	60.8
		Im:Ad		0.9	0.6	0.8	0.7	0.6	1.2	0.8	1.0	0.6	1.2	0.7	0.8	0.4	0.4	0.6	0.7
		M:F (Ad)		2.0	2.3	2.7	2.2	2.5	4.1	1.7	1.8	2.7	3.6	3.0	2.6	2.7	2.8	3.0	3.1
		M:F (Im)		0.9	1.5	1.4	1.3	0.9	1.3	0.8	1.1	1.1	1.3	1.1	1.1	1.3	0.9	1.6	1.6
Alabama	1	Number	Ad M	2,600	1,700	2,000	2,800	4,500	3,600	7,100	5,700	3,300	5,000	8,000	4,400	4,500	6,600	6,300	4,600
			Ad F	1,100	600	900	2,300	1,800	2,300	3,500	2,100	700	2,200	3,100	1,900	3,100	2,500	2,300	2,800
			Im M	5,200	500	1,100	4,100	2,700	3,200	3,800	4,600	2,600	6,200	4,800	3,400	3,800	3,400	3,600	3,200
			Im F	5,800	1,000	900	3,700	2,200	2,600	4,000	2,300	1,300	4,900	4,200	2,700	3,500	2,600	4,100	4,000
			Total	14,700	3,800	4,800	13,000	11,200	11,800	18,400	14,700	7,900	18,300	20,100	12,400	14,900	15,100	16,300	14,600
		Percent		40.2	25.4	21.3	19.9	20.8	18.3	23.0	23.5	22.0	27.5	25.7	22.8	27.6	23.9	22.0	23.5
		Im:Ad		3.0	0.6	0.7	1.5	0.8	1.0	0.7	0.9	1.0	1.6	0.8	1.0	1.0	0.7	0.9	1.0
		M:F (Ad)		2.3	(2.8)	2.2	1.2	2.6	1.6	2.0	2.7	4.5	(2.3)	2.6	2.2	1.5	2.7	2.7	1.6
		M:F (Im)		0.9	(0.5)	1.2	1.1	1.3	1.2	0.9	2.0	2.0	(1.3)	1.1	1.2	1.1	1.3	0.9	0.8
Atlantic Flyway																			
Maine	1	Number	Ad M	100	100	100	100	200	300	300	200	200	500	400	300	600	500	600	1,100
			Ad F	100	tr.	0	100	300	300	200	300	200	400	400	200	600	500	300	1,000
			Im M	500	200	500	300	600	300	800	800	1,300	900	1,300	700	1,100	1,500	1,900	4,000
			Im F	300	100	300	300	200	400	600	600	800	1,400	1,000	600	900	1,500	1,400	2,700
			Total	1,000	500	800	800	1,400	1,400	1,800	1,900	2,500	3,300	3,100	1,700	3,200	4,000	4,200	8,900
		Percent		1.8	1.3	2.4	1.9	2.3	2.5	2.6	3.3	3.3	3.3	2.8	2.7	3.3	5.0	4.7	7.7
		Im:Ad		(4.5)	(2.1)	(9.7)	(2.6)	(1.8)	(1.2)	3.0	(2.6)	4.8	(2.6)	(2.9)	2.7	(1.6)	(3.1)	3.4	3.2
		M:F (Ad)		(1.0)	(3.8)	(**)	(1.4)	(0.8)	(0.9)	(1.9)	(0.7)	(1.1)	(1.5)	(0.9)	1.2	(1.0)	(1.1)	(1.9)	(1.1)
		M:F (Im)		(1.4)	(2.0)	(1.9)	(0.8)	(2.8)	(0.8)	1.4	(1.4)	1.7	(0.6)	(1.3)	1.2	(1.2)	(1.0)	1.4	1.5
Vermont	1	Number	Ad M	tr.	300	100	100	100	200	300	100	300	300	500	200	500	200	300	800
			Ad F	100	100	200	100	300	200	600	300	400	300	600	900	1,000	1,100		
			Im M	400	700	700	400	1,100	900	1,400	900	1,100	1,500	1,600	1,000	2,700	3,100	2,500	2,500
			Im F	300	500	400	800	800	500	1,000	900	1,700	1,000	2,200	1,000	2,800	2,700	3,800	3,100
			Total	800	1,600	1,400	1,500	2,400	1,800	3,400	2,100	3,500	3,100	4,700	2,600	6,500	6,900	7,600	7,500
		Percent		8.9	9.8	5.9	10.0	9.8	9.1	13.7	9.5	14.0	10.2	12.4	10.6	16.8	18.5	20.1	17.6
		Im:Ad		7.4	(3.2)	(3.4)	4.7	4.4	3.3	2.6	4.9	4.2	4.1	4.5	3.9	5.1	5.2	4.9	3.0
		M:F (Ad)		(0.4)	(2.1)	(0.4)	(1.3)	(0.4)	(1.4)	(0.4)	(0.4)	(0.8)	(1.1)	(1.3)	0.8	(0.7)	(0.2)	(0.3)	(0.7)
		M:F (Im)		(1.3)	(1.5)	(1.8)	0.5	1.3	1.7	1.4	0.9	0.6	1.6	0.8	1.0	1.0	1.2	0.7	0.8
New Hampshire	1	Number	Ad M	500	200	0	tr.	100	tr.	100	200	200	400	200	200	300	100	800	200
			Ad F	tr.	100	100	100	100	200	tr.	100	200	600	300	200	100	300	400	200
			Im M	200	400	100	100	200	400	600	300	700	1,000	300	400	1,600	1,600	2,100	1,700
			Im F	200	500	200	100	200	500	700	500	500	600	500	400	700	700	2,600	1,800
			Total	1,000	1,200	300	400	700	1,200	1,400	1,100	1,700	2,600	1,400	1,200	2,700	2,600	5,900	3,900
		Percent		8.0	9.2	3.0	4.3	3.5	5.4	5.4	7.5	9.3	8.6	6.3	6.5	10.0	13.2	21.9	10.6
		Im:Ad		(0.9)	(3.2)	(4.5)	(1.6)	(2.5)	(4.0)	(11.2)	(2.4)	2.9	(1.8)	(1.6)	2.7	(5.9)	6.4	4.2	(7.9)
		M:F (Ad)		(10.0)	(2.3)	(0.0)	(0.5)	(1.1)	(0.1)	(2.4)	(2.8)	(1.0)	(0.7)	(0.7)	0.9	(2.0)	(0.2)	(2.1)	(1.1)
		M:F (Im)		(1.1)	(0.8)	(0.5)	(1.2)	(1.1)	(0.9)	(0.9)	(0.7)	(1.4)	(1.6)	(0.6)	1.0	(2.2)	(2.4)	0.8	(0.9)

Table A-11.--continued. Size, age, and sex characteristics of the annual mallard harvest by harvest area and State of harvest, 1960-1974. (All mallard bloodlines and all U. S. waterfowl seasons included; Ad = adult, Im = immature, M = male, F = female.)

State and Flyway	Harvest area	Parameter estimated	Hunting Season 1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1961-1970 Average	1971-72	1972-73	1973-74	1974-75
Atlantic Flyway																		
Mass.	1	Ad M	700	500	700	600	800	700	1,500	1,500	1,500	1,500	1,600	1,100	1,600	2,200	2,500	3,300
		Ad F	700	300	500	400	900	500	900	800	1,000	800	1,300	700	1,300	1,900	1,700	2,700
		Im M	2,000	1,500	1,200	700	1,600	1,300	2,600	3,300	3,500	3,500	3,000	2,200	2,900	4,300	5,000	6,600
		Im F	1,500	700	800	700	1,300	1,900	2,000	2,700	2,900	3,100	3,500	2,000	3,000	4,100	7,300	6,000
		Total	5,000	3,000	3,200	2,500	4,600	4,400	6,900	8,200	8,900	8,800	9,400	6,000	8,800	12,500	16,500	18,600
		Percent	8.0	6.2	7.9	5.5	6.9	6.9	7.5	12.0	13.5	11.0	9.0	8.9	11.9	16.0	17.7	15.0
		Im:Ad	2.5	(2.5)	1.6	1.4	1.8	2.7	2.0	2.7	2.6	3.0	2.2	2.3	2.1	2.1	2.9	2.1
		M:F (Ad)	(1.1)	(1.5)	(1.5)	(1.3)	(0.9)	(1.3)	1.6	1.9	1.5	(1.9)	(1.3)	1.5	(1.2)	1.2	1.5	1.3
		M:F (Im)	1.3	(2.2)	1.5	1.0	1.3	0.7	1.3	1.2	1.2	1.2	0.9	1.1	1.0	1.1	0.7	1.1
Conn.	1	Ad M	300	300	500	500	700	1,300	1,400	1,300	1,800	2,000	2,000	1,200	2,300	2,100	2,000	2,200
		Ad F	400	700	800	600	900	600	800	800	1,400	900	2,100	1,000	1,600	1,600	1,400	1,600
		Im M	1,400	1,600	1,600	1,100	2,200	2,400	2,000	2,600	2,400	2,600	2,800	2,100	4,400	4,600	4,600	4,100
		Im F	1,600	1,300	900	700	1,900	2,400	1,600	2,200	2,400	1,400	3,400	1,800	3,700	3,400	2,600	3,800
		Total	3,700	4,000	3,800	2,900	5,600	6,700	5,800	6,900	8,000	7,000	10,300	6,100	12,000	11,800	10,600	11,700
		Percent	13.6	26.2	17.2	15.4	25.6	21.7	25.7	24.7	19.7	17.2	20.7	21.0	27.3	28.3	28.7	30.0
		Im:Ad	4.5	2.9	2.0	1.6	2.6	2.5	1.6	2.3	1.5	1.4	1.5	1.9	2.1	2.2	2.1	2.1
		M:F (Ad)	(0.6)	(0.4)	(0.6)	(0.9)	(0.8)	2.1	1.9	1.6	1.3	2.2	1.0	1.2	1.4	1.3	(1.4)	1.4
		M:F (Im)	(0.9)	1.3	1.8	1.5	1.2	1.0	1.2	1.1	1.0	1.8	0.8	1.2	1.2	1.3	1.8	1.1
Rhode Island	1	Ad M	100	200	200	100	200	tr.	200	200	500	500	600	300	600	400	500	500
		Ad F	tr.	300	200	100	100	100	100	100	100	500	300	200	300	200	200	200
		Im M	100	500	100	300	300	200	400	400	900	400	500	400	900	1,000	600	1,100
		Im F	200	600	100	100	300	200	400	300	600	300	200	300	1,200	800	600	900
		Total	400	1,600	700	600	800	500	1,100	1,000	2,100	1,700	1,600	1,200	3,000	2,500	1,900	2,700
		Percent	3.3	13.8	9.1	5.0	7.1	5.2	7.3	8.0	10.1	17.0	11.5	9.4	15.5	14.3	15.8	19.0
		Im:Ad	(2.8)	(2.1)	(0.6)	(2.0)	2.0	(4.8)	(2.7)	(2.2)	2.4	(0.7)	(0.9)	1.6	(2.4)	(3.1)	1.9	3.2
		M:F (Ad)	(1.5)	(0.8)	(1.1)	(1.7)	(1.8)	(0.7)	(2.5)	(3.0)	(5.7)	(0.9)	(2.2)	1.6	(1.8)	(2.5)	(2.6)	(3.2)
		M:F (Im)	(0.8)	(0.9)	(1.3)	(2.2)	(0.8)	(1.1)	(1.2)	(1.6)	(1.6)	(1.6)	(2.2)	1.4	(0.8)	(1.3)	(1.0)	(1.3)
New York	1	Ad M		1,700	2,300	2,000	2,900	2,500	2,200	3,000	4,100	8,300	3,500	3,300	4,900	6,800	6,500	9,900
		Ad F		1,900	1,900	1,700	2,800	2,800	3,000	4,100	4,500	9,400	6,200	3,800	5,000	8,000	7,000	7,600
		Im M		7,500	5,000	5,400	8,100	10,000	12,000	10,600	18,500	23,500	22,600	12,300	19,400	28,000	29,600	26,100
		Im F		8,400	5,300	5,100	8,100	9,000	9,500	13,200	15,400	27,800	22,600	12,400	19,600	24,100	21,800	18,400
		Total		19,500	14,500	14,100	21,900	24,300	26,600	30,900	42,400	68,900	55,000	31,800	48,900	66,900	64,900	62,000
		Percent		23.2	23.3	30.5	27.1	25.4	22.1	22.0	30.3	35.0	26.7	27.1	27.9	35.4	38.6	44.2
		Im:Ad		4.3	2.4	2.9	2.8	3.6	4.1	3.4	3.9	2.9	4.7	3.5	3.9	3.5	3.8	2.5
		M:F (Ad)		(0.9)	1.2	1.2	1.0	0.9	0.7	0.7	0.9	0.9	0.6	0.8	1.0	0.9	0.9	1.3
		M:F (Im)		0.9	0.9	1.1	1.0	1.1	1.3	0.8	1.2	0.8	1.0	1.0	1.0	1.2	1.4	1.4
	2	Ad M		400	600	1,100	400	800	800	2,400	2,300	2,700	2,500	1,400	2,600	1,800	3,000	4,000
		Ad F		800	1,100	600	900	800	900	2,100	2,400	2,300	2,400	1,400	1,900	1,800	2,000	3,500
		Im M		2,600	2,100	2,700	2,600	3,800	3,600	5,600	4,700	9,200	8,000	4,500	6,100	10,100	10,500	10,500
		Im F		2,500	1,900	2,400	2,000	2,800	3,400	5,900	6,500	7,700	8,800	4,400	7,800	7,700	9,000	10,800
		Total		6,200	5,700	6,900	5,800	8,200	8,700	16,000	16,000	21,900	21,700	11,700	18,400	21,400	24,500	28,800
		Percent		16.1	20.5	29.5	24.1	23.6	22.9	26.7	27.7	26.0	30.3	25.5	28.1	31.7	35.8	41.1
		Im:Ad		4.4	2.3	2.9	3.6	4.1	4.0	2.6	2.4	3.4	3.4	3.1	3.1	5.0	4.0	2.8
		M:F (Ad)		(0.5)	(0.5)	(1.8)	(0.4)	(1.0)	(0.9)	(1.2)	(0.9)	(1.2)	(1.1)	1.0	(1.4)	(1.0)	(1.5)	(1.1)
		M:F (Im)		1.0	1.1	1.2	1.3	1.4	1.0	0.9	0.7	1.2	0.9	1.0	0.8	1.3	1.2	1.0
	3	Ad M		700	1,500	900	1,300	1,900	1,200	1,500	2,000	2,500	1,800	1,500	4,100	1,900	4,100	3,000
		Ad F		300	300	400	1,100	1,000	500	1,300	700	1,500	300	700	2,200	300	3,100	2,000
		Im M		2,300	1,100	1,900	2,000	1,600	2,900	1,700	1,900	3,600	3,000	2,200	4,600	1,700	5,100	3,300
		Im F		1,700	800	1,100	1,500	1,400	1,300	2,100	2,600	1,500	1,400	1,500	3,000	400	5,000	1,800
		Total		5,000	3,700	4,300	6,000	5,900	6,000	6,600	7,100	9,100	6,500	6,000	13,900	4,400	17,300	10,100
		Percent		12.5	7.4	8.3	14.1	14.2	16.7	13.7	12.5	14.4	10.5	12.2	21.2	7.9	27.3	17.2
		Im:Ad		(4.2)	(1.1)	(2.3)	1.5	1.0	2.4	1.3	1.7	(1.3)	(2.1)	1.7	1.2	(1.0)	1.4	(1.0)
		M:F (Ad)		(2.4)	(4.8)	(2.6)	(1.2)	(1.8)	(2.4)	(1.2)	(3.0)	(1.6)	(6.7)	2.1	(1.8)	(6.1)	(1.3)	(1.5)
		M:F (Im)		(1.3)	(1.3)	(1.8)	1.4	(1.1)	2.2	(0.8)	(0.7)	(2.4)	(2.1)	1.4	(1.5)	(3.9)	(1.0)	(1.8)

Combined		Ad M	1,900	2,800	4,400	4,000	4,600	5,200	4,300	6,900	8,300	13,400	7,900	6,200	11,500	10,500	13,500	16,900
		Ad F	3,400	3,000	3,300	2,700	4,800	4,600	4,400	7,500	7,600	13,200	8,800	6,000	9,200	10,100	12,100	13,100
		Im M	17,200	12,400	8,100	10,000	12,700	15,400	18,500	17,900	25,100	36,300	33,600	19,000	30,100	39,800	45,200	39,900
		Im F	13,800	12,600	8,000	8,500	11,600	13,200	14,200	21,200	24,500	37,000	32,800	18,400	30,400	32,300	35,900	31,000
		Total	36,300	30,800	23,900	25,300	33,700	38,400	41,400	53,500	65,500	99,900	83,200	49,500	81,200	92,700	106,700	101,000
		Percent	19.7	18.9	17.1	20.9	22.9	22.3	21.3	21.5	25.7	29.0	24.5	23.3	26.5	29.7	35.6	37.5
		Im:Ad	5.9	4.3	2.1	2.8	2.6	2.9	3.8	2.7	3.1	2.8	4.0	3.1	2.9	3.5	3.2	2.4
		M:F (Ad)	(0.6)	0.9	1.3	1.5	1.0	1.1	1.0	0.9	1.1	1.0	0.9	1.0	1.3	1.0	1.1	1.3
		M:F (Im)	1.3	1.0	1.0	1.2	1.1	1.2	1.3	0.8	1.0	1.0	1.0	1.0	1.0	1.2	1.3	1.3
Penn.	1	Ad M		1,700	900	900	1,100	1,500	2,600	2,600	2,600	2,700	2,300	1,900	3,400	4,200	2,600	2,300
		Ad F		600	600	1,100	1,200	1,700	1,700	2,100	1,700	1,800	1,300	1,400	2,100	2,700	2,400	3,300
		Im M		2,900	1,800	2,600	3,100	4,100	5,900	7,200	5,700	6,500	5,400	4,500	8,300	6,200	6,600	13,600
		Im F		2,900	1,600	2,500	3,500	3,600	5,000	6,600	7,300	5,700	4,300	4,300	6,600	4,900	7,400	11,300
		Total		8,100	5,000	7,200	8,900	10,900	15,200	18,500	17,200	16,700	13,300	12,100	20,400	17,900	18,900	30,500
		Percent		37.8	27.0	30.1	30.3	32.7	35.9	38.3	36.9	35.1	30.5	34.1	35.7	30.4	46.1	45.1
		Im:Ad		2.5	2.2	2.5	2.9	2.4	2.5	3.0	3.1	2.7	2.7	2.7	2.7	1.6	2.8	4.4
		M:F (Ad)		(2.6)	1.4	0.8	0.9	0.9	1.5	1.2	(1.6)	(1.5)	(1.7)	1.3	(1.6)	(1.6)	(1.1)	(0.7)
		M:F (Im)		(1.0)	1.1	1.0	0.9	1.2	1.2	1.1	0.8	1.1	1.3	1.1	1.3	1.3	0.9	1.2
	2	Ad M		1,100	3,500	3,900	5,500	5,000	5,900	7,000	8,000	13,400	13,400	6,700	15,500	10,200	6,900	10,200
		Ad F		1,400	1,700	3,100	3,100	2,600	3,000	4,800	3,900	6,900	7,900	3,800	7,000	5,900	5,500	4,800
		Im M		5,400	5,400	7,800	8,400	8,200	8,500	12,200	11,200	13,000	18,700	9,900	15,100	11,100	12,000	19,500
		Im F		3,200	4,300	6,200	7,600	7,400	8,000	10,000	10,200	9,300	12,800	7,900	11,400	12,500	10,900	16,900
		Total		11,200	14,900	21,000	24,600	23,200	25,500	34,100	33,300	42,600	52,800	28,300	48,900	39,700	35,400	51,400
		Percent		49.4	46.6	48.6	48.5	45.3	45.3	49.6	55.0	54.8	58.2	51.1	48.7	51.8	50.7	54.6
		Im:Ad		3.4	1.9	2.0	1.9	2.0	1.9	1.9	1.8	1.1	1.5	1.7	1.2	1.5	1.8	2.4
		M:F (Ad)		(0.8)	2.0	1.3	1.8	1.9	2.0	1.5	2.1	2.0	1.7	1.7	2.2	1.7	1.3	2.1
		M:F (Im)		1.7	1.3	1.3	1.1	1.1	1.1	1.2	1.1	1.4	1.5	1.3	1.3	0.9	1.1	1.2
Combined		Ad M	2,000	2,800	4,400	4,900	6,600	6,500	8,500	9,600	10,600	16,100	15,600	8,600	18,800	14,300	9,600	12,600
		Ad F	1,700	2,000	2,400	4,200	4,300	4,300	4,700	6,900	5,500	8,700	9,300	5,200	9,100	8,500	7,900	8,100
		Im M	8,900	8,300	7,200	10,400	11,600	12,300	14,400	19,400	16,900	19,500	24,100	14,400	23,400	17,300	18,600	33,000
		Im F	7,800	6,100	5,900	8,700	11,100	10,900	13,000	16,600	17,500	15,000	17,100	12,200	18,100	17,400	18,200	28,100
		Total	20,400	19,300	19,900	28,200	33,500	34,000	40,600	52,600	50,500	59,300	66,100	40,400	69,400	57,600	54,300	81,800
		Percent	38.8	43.7	39.4	42.0	41.8	40.4	41.3	44.9	47.1	47.3	49.2	44.5	44.0	42.5	49.0	50.6
		Im:Ad	4.5	3.0	1.9	2.1	2.1	2.2	2.1	2.2	2.1	1.4	1.7	1.9	1.5	1.5	2.1	3.0
		M:F (Ad)	(1.2)	(1.4)	1.8	1.1	1.5	1.5	1.8	1.4	1.9	1.9	1.7	1.6	2.1	1.7	1.2	1.6
		M:F (Im)	1.2	1.4	1.2	1.2	1.0	1.1	1.1	1.2	1.0	1.3	1.4	1.2	1.3	1.0	1.0	1.2
West Virginia	1	Ad M	200	200	300	300	200	100	500	300	500	300	800	300	400	400	200	200
		Ad F	100	0	100	100	100	tr.	100	200	100	100	100	100	200	200	100	200
		Im M	200	100	800	400	100	200	300	300	500	300	400	300	300	500	400	900
		Im F	100	200	300	200	tr.	200	200	200	400	200	1,500	300	200	300	300	400
		Total	600	400	1,500	1,100	500	500	1,000	1,100	1,400	900	2,800	1,100	1,000	1,400	1,000	1,700
		Percent	19.9	(27.2)	25.4	29.9	19.2	(15.8)	30.9	25.9	24.9	18.9	25.6	24.7	30.8	28.4	30.0	28.9
		Im:Ad	(1.1)	(1.2)	2.4	1.4	(0.7)	(3.2)	0.8	(1.1)	1.6	(1.5)	2.1	1.6	0.9	1.3	(2.4)	3.2
		M:F (Ad)	(2.1)	(**)	(3.0)	(3.0)	(1.3)	(1.7)	(3.2)	(1.1)	(7.8)	(3.9)	(7.2)	3.3	(2.0)	(2.3)	(1.0)	(1.3)
		M:F (Im)	(1.4)	(0.4)	(2.4)	(2.0)	(3.3)	(0.8)	(1.3)	(1.4)	(1.3)	(1.5)	(0.3)	1.0	(1.7)	(1.7)	(1.2)	(1.9)
New Jersey	1	Ad M	1,200	1,800	2,300	3,700	3,200	3,300	3,700	3,700	5,400	5,100	4,500	3,700	6,200	6,300	4,400	9,000
		Ad F	700	1,100	2,000	2,200	2,200	2,300	1,600	3,000	3,100	2,400	2,600	2,200	3,000	3,300	4,300	4,400
		Im M	2,500	1,900	3,800	5,700	5,000	5,100	5,000	6,000	7,700	6,700	7,600	5,400	6,400	10,600	8,100	13,700
		Im F	2,000	1,300	3,100	4,900	4,900	4,200	3,600	5,900	7,100	7,100	4,600	4,700	12,700	8,900	7,200	10,100
		Total	6,400	6,200	11,200	16,500	15,200	14,900	13,900	18,600	23,400	21,300	19,300	16,000	28,300	29,000	24,000	37,200
		Percent	13.0	14.4	16.1	18.3	16.4	14.7	13.2	16.4	21.2	16.5	17.8	16.7	17.8	22.2	17.4	24.7
		Im:Ad	2.3	1.1	1.6	1.8	1.8	1.7	1.6	1.8	1.7	1.8	1.7	1.7	2.1	2.1	1.8	1.8
		M:F (Ad)	1.7	1.6	1.2	1.7	1.4	1.4	2.4	1.2	1.7	2.1	1.8	1.6	(2.0)	1.9	1.0	2.0
		M:F (Im)	1.3	1.5	1.2	1.2	1.0	1.2	1.4	1.0	1.1	0.9	1.6	1.2	0.5	1.2	1.1	1.3
Delaware	1	Ad M	1,100	1,200	900	900	1,500	900	1,600	1,800	3,100	3,100	3,900	1,900	2,900	5,400	1,500	3,400
		Ad F	700	1,100	900	800	800	500	1,400	1,500	1,700	2,300	3,500	1,500	1,900	4,000	2,500	2,100
		Im M	1,300	1,900	900	1,200	2,100	1,100	2,200	3,100	3,900	3,100	6,000	2,600	3,300	6,700	6,700	3,900
		Im F	1,400	900	700	900	2,500	1,400	3,400	2,600	4,300	3,200	5,100	2,500	3,800	4,800	4,900	2,800
		Total	4,500	5,200	3,400	3,900	6,900	3,900	8,700	8,900	13,000	11,600	18,600	8,400	11,900	20,800	15,700	12,200
		Percent	16.1	17.1	21.5	18.5	23.9	19.2	24.8	26.6	37.3	29.9	31.0	26.4	22.3	39.4	36.7	31.4
		Im:Ad	1.5	1.2	0.9	1.3	2.0	1.8	1.8	1.8	1.7	1.2	1.5	1.5	1.5	1.2	2.9	1.2
		M:F (Ad)	(1.6)	(1.1)	1.0	1.2	1.8	(1.7)	1.1	1.2	1.8	1.4	1.1	1.3	(1.5)	1.4	(0.6)	1.6
		M:F (Im)	(0.9)	(2.2)	1.3	1.4	0.8	0.8	0.6	1.2	0.9	1.0	1.2	1.0	0.9	1.4	1.4	1.4

Table A-11.--continued. Size, age, and sex characteristics of the annual mallard harvest by harvest area and State of harvest, 1960-1974. (All mallard bloodlines and all U. S. waterfowl seasons included; Ad = adult, Im = immature, M = male, F = female.)

State and Flyway	Harvest area	Parameter estimated	Hunting Season 1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1961-1970 Average	1971-72	1972-73	1973-74	1974-75
Atlantic Flyway																		
Maryland	1	Ad M	2,500	2,100	4,200	3,200	3,900	4,000	6,000	4,400	6,200	14,400	11,200	6,000	10,000	11,500	7,500	8,900
		Ad F	1,400	1,900	2,500	1,600	1,600	1,400	5,300	2,800	2,000	7,800	5,400	3,200	7,200	6,200	5,400	3,400
		Im M	4,400	3,400	4,400	3,000	5,400	5,100	7,300	7,500	11,600	13,000	20,500	8,100	11,100	12,700	9,100	16,100
		Im F	2,200	2,000	3,400	3,000	4,700	3,000	8,800	7,700	6,300	9,100	11,500	6,000	10,700	8,900	10,300	12,300
		Total	10,500	9,400	14,500	10,900	15,600	13,500	27,500	22,500	26,000	44,300	48,700	23,300	38,900	39,200	32,300	40,800
		Percent	18.3	17.6	24.2	19.5	17.3	17.8	15.6	25.1	30.7	20.6	43.0	23.0	28.3	38.7	30.6	40.4
		Im:Ad	1.7	1.4	1.1	1.2	1.8	1.5	1.4	2.1	2.2	1.0	1.9	1.5	1.3	1.2	1.5	2.3
		M:F (Ad)	1.7	(1.1)	1.7	2.0	2.4	2.8	1.1	1.6	3.1	1.8	2.1	1.8	1.4	1.9	1.4	2.6
		M:F (Im)	2.0	(1.7)	1.3	1.0	1.1	1.7	0.8	1.0	1.9	1.4	1.8	1.4	1.0	1.4	0.9	1.3
Virginia	1	Ad M	2,900	2,200	3,200	5,200	3,900	3,200	5,600	4,900	3,900	4,400	5,200	4,200	7,200	10,700	6,600	6,100
		Ad F	1,100	700	1,700	2,600	2,000	1,500	2,300	2,900	1,600	2,600	1,400	1,900	4,300	6,700	3,700	4,000
		Im M	3,800	1,600	2,700	3,600	3,000	2,100	6,000	4,800	3,900	5,000	7,800	4,100	4,700	5,900	6,400	5,500
		Im F	2,600	800	2,300	2,600	3,300	2,600	4,300	3,900	4,100	3,900	5,600	3,300	4,300	4,000	5,500	4,200
		Total	10,400	5,300	10,000	14,000	12,100	9,400	18,200	16,500	13,400	15,900	20,100	13,500	20,600	27,300	22,100	19,700
		Percent	16.5	15.9	23.1	27.1	25.6	24.3	23.5	23.3	18.6	14.4	18.9	20.7	19.2	23.9	23.1	22.1
		Im:Ad	1.6	0.8	1.0	0.8	1.1	1.0	1.3	1.1	1.4	1.3	2.0	1.2	0.8	0.6	1.2	1.0
		M:F (Ad)	(2.6)	3.3	1.8	2.0	2.0	2.2	2.5	1.7	(2.5)	1.7	3.7	2.2	1.7	1.6	1.8	1.5
		M:F (Im)	1.5	2.1	1.2	1.4	0.9	0.8	1.4	1.2	0.9	1.3	1.4	1.2	1.1	1.5	1.2	1.3
North Carolina	1	Ad M	2,400	1,400	2,000	2,300	2,200	1,800	5,200	3,000	3,400	4,500	6,800	3,300	9,200	7,600	3,700	5,700
		Ad F	1,400	1,000	1,000	1,600	1,000	1,300	2,400	2,100	1,100	3,400	3,600	1,800	2,900	6,100	1,400	2,400
		Im M	3,400	700	1,800	2,100	3,200	1,500	2,100	2,400	4,100	3,400	5,500	2,700	2,200	5,000	2,900	4,300
		Im F	2,100	1,200	1,200	2,600	2,500	1,900	3,600	3,000	6,200	3,500	5,800	3,100	3,600	6,000	3,200	4,200
		Total	9,300	4,300	5,900	8,600	8,900	6,500	13,300	10,500	14,900	14,800	21,700	11,000	18,000	24,700	11,200	16,600
		Percent	12.1	9.4	12.1	13.1	10.7	10.8	13.5	9.3	12.3	12.5	13.7	12.0	12.5	19.2	12.2	11.7
		Im:Ad	1.4	0.8	1.0	1.2	1.8	1.1	0.7	1.1	2.3	0.9	1.1	1.1	0.5	0.8	1.2	1.0
		M:F (Ad)	1.6	(1.5)	2.1	1.5	(2.3)	(1.4)	2.1	(1.4)	(3.1)	(1.3)	1.9	1.8	3.2	1.3	(2.7)	2.4
		M:F (Im)	1.6	(0.6)	1.5	0.8	1.3	(0.8)	0.6	(0.8)	0.7	(1.0)	1.0	0.9	(0.6)	0.8	(0.9)	1.0
South Carolina	1	Ad M	3,000	4,400	3,300	4,500	5,400	5,300	10,100	7,600	4,400	6,500	10,800	6,200	7,800	7,800	5,300	4,400
		Ad F	1,700	1,800	1,700	2,500	2,800	2,700	5,200	3,900	3,800	4,000	6,000	3,400	4,300	3,900	2,500	2,200
		Im M	2,000	2,200	4,200	3,600	3,300	3,900	7,100	5,300	5,600	6,500	9,900	5,200	5,000	3,900	4,000	4,900
		Im F	3,400	1,300	3,200	4,300	3,700	5,100	8,900	5,200	4,900	6,500	7,300	5,000	3,000	3,400	4,000	5,900
		Total	10,100	9,700	12,300	14,800	15,200	16,900	31,300	22,000	18,700	23,400	34,100	19,800	20,000	19,000	15,800	17,400
		Percent	23.1	24.7	22.0	19.7	23.6	21.9	27.2	20.5	15.7	17.3	23.1	21.2	20.6	14.4	15.9	12.6
		Im:Ad	1.1	0.6	1.5	1.1	0.9	1.1	1.0	0.9	1.3	1.2	1.0	1.1	0.7	0.6	1.0	1.7
		M:F (Ad)	(1.8)	2.5	(1.9)	1.8	1.9	2.0	1.9	2.0	1.1	1.6	1.8	1.8	1.8	2.0	2.1	(2.0)
		M:F (Im)	0.6	(1.6)	1.3	0.8	0.9	0.8	0.8	1.0	1.1	1.0	1.4	1.0	1.7	1.1	1.0	0.8
Georgia	1	Ad M	400	400	700	1,100	1,100	2,300	1,700	1,200	2,800	3,200	2,900	1,700	8,200	3,600	3,400	2,200
		Ad F	100	0	600	800	600	1,800	900	200	1,500	1,600	1,700	1,000	4,400	2,000	1,800	1,800
		Im M	400	0	700	1,800	800	1,500	1,500	1,000	1,800	3,000	1,600	1,400	1,900	2,200	4,200	2,700
		Im F	0	0	700	1,200	1,000	1,700	2,000	1,400	1,500	2,700	1,500	1,400	3,300	2,700	3,500	2,300
		Total	900	400	2,800	4,900	3,400	7,200	6,100	3,900	7,500	10,500	7,700	5,400	17,800	10,500	13,000	8,900
		Percent	4.2	(1.8)	15.4	10.4	17.2	19.4	13.2	13.9	20.5	18.9	11.6	14.5	24.6	16.6	22.4	13.7
		Im:Ad	(0.9)	(0.0)	(1.0)	(1.6)	1.1	0.8	1.3	1.6	0.8	1.2	0.7	1.0	0.4	0.9	1.5	1.3
		M:F (Ad)	(3.0)	(**)	(1.2)	(1.4)	(1.9)	1.3	(1.9)	(5.1)	1.8	2.0	1.7	1.8	1.9	1.8	1.9	(1.2)
		M:F (Im)	(**)	(**)	(1.1)	(1.4)	(0.8)	(0.9)	0.7	(0.7)	1.2	1.1	(1.1)	1.0	(0.6)	0.8	1.2	(1.2)
Florida	1	Ad M	800	1,000	600	600	1,500	600	400	600	700	1,100	1,600	900	500	1,000	300	500
		Ad F	600	500	300	400	600	300	300	200	200	1,100	1,300	500	700	800	100	0
		Im M	1,300	1,100	700	1,400	600	400	900	1,000	1,000	1,000	2,900	1,100	300	1,000	400	1,000
		Im F	2,400	2,000	500	1,300	1,000	1,300	500	1,000	1,100	2,600	3,400	1,500	500	500	200	1,200
		Total	5,200	4,500	2,100	3,700	3,800	2,600	2,100	2,700	3,000	5,700	9,200	3,900	2,000	3,400	1,000	2,800
		Percent	4.6	3.7	2.2	2.3	2.8	1.8	0.9	1.3	1.7	2.4	2.3	2.1	1.1	1.7	0.5	1.4
		Im:Ad	(2.6)	(2.1)	(1.2)	2.7	0.8	(1.9)	(2.2)	(2.5)	(2.4)	(1.6)	2.2	1.9	(0.7)	(0.9)	(1.4)	(4.1)
		M:F (Ad)	(1.4)	(2.0)	(1.9)	(1.7)	(2.4)	(1.8)	(1.5)	(3.0)	(3.5)	(1.0)	(1.2)	1.7	(0.6)	(1.2)	(2.3)	(**)
		M:F (Im)	(0.5)	(0.5)	(1.5)	(1.2)	(0.6)	(0.3)	(1.7)	(1.0)	(0.9)	(0.4)	(0.8)	0.8	(0.5)	(2.0)	(2.2)	(0.8)

Table A-12. Summary, by flyway, of annual bias-adjusted estimates of percentages of the total duck bag composed of black ducks and total numbers of black ducks bagged, 1952-1974. (All U. S. waterfowl seasons included.)

Hunting season	Alaska[a]		Pacific Flyway[a]		Central Flyway[a]		Mississippi Flyway		Atlantic Flyway		Entire United States: Excluding Alaska		Entire United States: Including Alaska	
	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number
1952-53	(Black duck figures not recorded separately.)						4.2	219,200	27.9	381,500	(Black duck data not all separable.)			
1953-54	0	0	0	0	0.4	13,000	4.1	188,200	25.0	321,500	3.9	522,700	3.9	522,700
1954-55	0	0	tr.	tr.	0.1	1,900	4.8	197,500	24.6	324,600	4.5	524,000	4.5	524,000
1955-56	0	0	0	0	0.1	1,600	4.3	230,800	22.2	387,900	4.4	620,200	4.4	620,200
1956-57	Not in survey		0	0	0.1	2,100	3.7	185,700	21.2	315,900	3.8	503,700	Alaska not in survey	
1957-58			0	0	tr.	1,700	3.5	202,100	21.3	318,200	3.4	522,000		
1958-59			tr.	700	0.1	2,400	3.6	168,500	21.4	276,100	3.5	447,600		
1959-60			0	0	0.1	1,100	4.5	123,000	26.0	183,400	4.4	307,500		
1960-61[b/c]			0	0	1.1[d]	15,900[d]	4.3	135,200	29.7	258,100	5.1	409,200		
1961-62			0	0	0.1	1,000	3.6	62,900	27.8	204,800	5.0	268,700		
1962-63			0	0	0.1	400	4.2	47,900	28.9	214,500	6.2	262,900		
1963-64			0	0	0.1	1,100	2.8	70,400	23.8	215,800	4.0	287,300		
1964-65			0	0	0.1	900	2.7	96,900	23.6	234,400	4.0	332,200		
1965-66			0	0	tr.	500	2.7	97,600	21.3	217,100	3.6	315,200		
1966-67	0	0	0	0	0.1	1,700	2.3	114,600	19.8	281,400	3.3	397,700	3.3	397,700
1967-68	0	0	0	0	0.1	2,800	2.4	113,100	19.7	265,500	3.0	381,400	3.0	381,400
1968-69	0	0	0	0	0.1	1,000	2.9	68,300	22.0	301,500	4.6	370,800	4.6	370,800
1969-70	0	0	0	0	0.1	1,400	2.0	88,100	17.1	307,400	3.1	396,900	3.1	396,900
1970-71	0	0	0	0	tr.	200	1.9	119,700	15.0	297,400	2.6	417,400	2.6	417,400
1971-72	0	0	0	0	tr.	200	1.8	96,200	17.0	293,100	2.8	389,500	2.8	389,500
1972-73	0	0	0	0	tr.	1,400	2.4	117,900	14.3	236,300	2.6	355,600	2.6	355,600
1973-74	0	0	0	0	tr.	800	2.4	110,900	17.0	262,700	3.2	374,300	3.2	374,300
1974-75	0	0	0	0	tr.	1,000	1.8	93,300	17.0	294,600	3.1	388,800	3.0	388,800

a/ Included with "others" on forms used in these States through 1960-61; figures based on tally of write-ins by hunters.
b/ Estimates based solely on questionnaire data until 1961 in Pacific and Central Flyways and Alaska, until 1960 elsewhere; subsequent estimates based on both questionnaire and wing survey data.
c/ Estimates summarized by State of duck stamp purchase through 1960; by State of kill beginning with 1961.
d/ Figure not comparable since many hunters in this flyway were sent forms listing the black duck this year only.

Table A-13. Summary, by flyway, of annual estimates of the percentages of the total duck bag composed of mottled, Mexican, and mallard x black hybrid ducks together with bias-adjusted estimates of the total bag of each, 1961-1974

Hunting season		Alaska		Pacific Flyway		Central Flyway		Mississippi Flyway		Atlantic Flyway		Entire United States: Excluding Alaska		Entire United States: Including Alaska	
		Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number
1961-62	Mottled	Not in survey		0	0	2.0	15,900	0.8	14,600	2.6	19,200	0.9	49,700	Alaska not in survey	
	Mexican			0	0	tr.	tr.	0	0	0	0	tr.	tr.		
	Mal x Bl			0	0	tr.	200	0.2	3,600	1.0	7,700	0.2	11,500		
1962-63	Mottled			0	0	2.3	9,900	0.8	8,800	1.7	12,800	0.7	31,500		
	Mexican			0	0	tr.	tr.	0	0	0	0	tr.	tr.		
	Mal x Bl			tr.	100	0	0	0.2	2,700	0.9	6,500	0.2	9,300		
1963-64	Mottled			0	0	1.9	18,800	0.8	20,300	1.4	12,600	0.7	51,800		
	Mexican			0	0	tr.	tr.	0	0	0	0	tr.	tr.		
	Mal x Bl			tr.	100	tr.	300	0.1	2,600	0.7	6,100	0.1	9,100		
1964-65	Mottled			0	0	2.1	28,200	1.1	39,100	1.4	14,100	1.0	81,500		
	Mexican			0	0	0	0	0	0	0	0	0	0		
	Mal x Bl			0	0	tr.	100	0.2	5,800	0.7	6,800	0.2	12,700		
1965-66	Mottled			0	0	2.1	26,000	0.8	28,800	1.1	10,800	0.7	65,600		
	Mexican			0	0	0	0	0	0	0	0	0	0		
	Mal x Bl			0	0	tr.	200	0.1	4,800	0.9	9,700	0.2	14,700		
1966-67	Mottled	0	0	0	0	3.3	70,900	1.0	49,100	1.0	13,600	1.1	133,500	1.1	133,500
	Mexican	0	0	0	0	tr.	tr.	0	0	0	0	tr.	tr.	tr.	tr.
	Mal x Bl	0	0	0	0	0	0	0.1	5,000	0.4	5,900	0.1	10,900	0.1	10,900
1967-68	Mottled	0	0	0	0	1.8	39,600	0.6	30,300	1.0	13,300	0.7	83,100	0.6	83,100
	Mexican	0	0	0	0	tr.	tr.	0	0	0	0	tr.	tr.	tr.	tr.
	Mal x Bl	0	0	tr.	tr.	tr.	200	0.1	4,800	0.4	5,900	0.1	10,900	0.1	10,900
1968-69	Mottled	0	0	0	0	3.8	47,400	1.4	32,500	1.5	21,000	1.3	100,900	1.2	100,900
	Mexican	0	0	tr.	100	0	0	0	0	0	0	tr.	100	tr.	100
	Mal x Bl	0	0	0	0	tr.	200	0.1	2,200	0.6	8,100	0.1	10,500	0.1	10,500
1969-70	Mottled	0	0	0	0	3.4	88,700	0.9	38,400	0.7	12,700	1.1	139,800	1.1	139,800
	Mexican	0	0	0	0	tr.	100	0	0	0	0	tr.	100	tr.	100
	Mal x Bl	0	0	0	0	0	0	0.2	7,000	0.5	9,500	0.1	16,500	0.1	16,500
1970-71	Mottled	0	0	0	0	3.9	118,300	1.3	82,300	2.4	48,100	1.6	248,700	1.6	248,700
	Mexican	0	0	tr.	300	tr.	100	0	0	0	0	tr.	400	tr.	400
	Mal x Bl	0	0	0	0	tr.	100	0.2	10,800	0.6	12,500	0.1	23,400	0.1	23,400
1971-72	Mottled	0	0	0	0	1.7	46,700	1.0	52,900	0.9	15,600	0.8	115,200	0.8	115,200
	Mexican	0	0	0	0	tr.	tr.	0	0	0	0	tr.	tr.	tr.	tr.
	Mal x Bl	0	0	0	0	0	0	0.1	3,200	0.3	5,500	0.1	8,700	0.1	8,700
1972-73	Mottled	0	0	0	0	3.1	90,700	0.8	40,300	1.4	23,900	1.1	155,000	1.1	155,000
	Mexican	0	0	tr.	300	tr.	tr.	0	0	0	0	tr.	300	tr.	300
	Mal x Bl	0	0	0	0	tr.	200	0.1	6,500	0.6	9,700	0.1	16,400	0.1	16,400
1973-74	Mottled	0	0	0	0	1.5	36,700	0.8	34,600	1.0	15,600	0.7	86,900	0.7	86,900
	Mexican	0	0	tr.	200	0.1	1,400	0	0	0	0	tr.	1,500	tr.	1,500
	Mal x Bl	0	0	0	0	tr.	100	0.1	6,100	0.4	6,500	0.1	12,700	0.1	12,700
1974-75	Mottled	0	0	0	0	3.2	70,100	0.8	43,100	0.8	13,300	1.0	126,400	1.0	126,400
	Mexican	0	0	tr.	1,000	tr.	400	0	0	0	0	tr.	1,300	tr.	1,300
	Mal x Bl	0	0	0	0	tr.	200	0.1	5,200	0.7	12,600	0.1	18,000	0.1	18,000

Table A-14. Average[a/] characteristics, by 5-day period, of mallards harvested in selected States, 1961-1970. (All mallard bloodlines included; experimental San Luis Valley, September Teal, and Late Black Duck seasons and the scaup-only and sea duck-only dates excluded; Ad = adult, Im = immature.)

State	Period	% mallards in duck bag	% Im in mallard bag	% males in Ad mallard bag	Total State season days	% of mallard bag per season day
Pacific Flyway						
Wash.	October 6-10	42.4	69.9	58.7	2	20.2
	October 11-15	46.8	69.0	60.2	31	14.1
	October 16-20	44.7	68.1	59.0	50	5.4
	October 21-25	43.5	60.9	56.8	50	3.4
	October 26-31	44.2	61.2	61.1	60	2.3
	November 1-5	52.5	58.6	63.5	50	3.4
	November 6-10	50.4	56.3	63.1	50	3.3
	November 11-15	50.9	59.5	69.4	50	4.4
	November 16-20	57.6	61.2	60.6	50	4.3
	November 21-25	56.8	57.1	62.2	50	5.1
	November 26-30	60.0	58.2	56.2	50	4.5
	December 1-5	58.0	53.4	64.0	50	3.2
	December 6-10	57.6	53.8	68.6	50	3.0
	December 11-15	65.1	54.3	66.9	50	3.1
	December 16-20	62.0	47.8	67.8	50	3.9
	December 21-25	49.6	50.8	56.2	50	2.2
	December 26-31	54.6	42.5	64.1	51	3.0
	January 1-5	55.6	42.5	68.3	40	2.7
	January 6-10	63.8	45.0	69.9	35	2.1
	January 11-15	66.7	41.8	63.4	35	1.3
	January 16-20	74.1	32.5	61.6	32	1.8
	January 21-25	89.1	35.3	75.5	14	3.2
	All periods	52.7	57.2	63.6	950	99.9
Mont.	October 1-5	47.7	56.8	(59.8)	3	35.0
	October 6-10	52.4	63.7	62.5	20	14.7
	October 11-15	54.3	69.6	60.3	40	4.6
	October 16-20	59.2	58.7	57.6	45	2.6
	October 21-25	65.7	56.4	64.0	49	2.8
	October 26-31	65.0	53.8	76.8	60	2.1
	November 1-5	79.2	49.1	64.0	50	2.7
	November 6-10	76.8	48.2	67.2	50	3.0
	November 11-15	80.7	56.5	65.6	50	3.2
	November 16-20	88.2	54.3	75.6	50	2.8
	November 21-25	89.4	52.2	70.2	50	4.6
	November 26-30	92.3	56.7	65.9	50	3.4
	December 1-5	89.2	55.1	72.2	50	3.6
	December 6-10	93.6	59.0	66.7	50	2.2
	December 11-15	89.3	56.4	64.9	50	2.1
	December 16-20	88.2	60.2	77.4	50	2.0
	December 21-25	87.8	53.6	67.3	45	2.8
	December 26-31	86.9	59.2	62.7	40	2.6
	Jan. 1-5	97.2	46.1	80.2	24	1.7
	Jan. 6-10	(98.6)	(84.8)	(80.4)	9	1.4
	All periods	74.5	57.0	67.1	835	99.9
Calif.	October 6-10	23.3	(73.5)	(29.9)	1	14.6
	October 11-15	19.1	76.4	50.3	12	10.8
	October 16-20	12.9	76.8	56.4	25	6.3
	October 21-25	18.6	75.8	63.9	42	8.4
	October 26-31	20.3	75.7	59.5	60	4.8
	November 1-5	18.2	68.0	69.0	50	3.6
	November 6-10	21.3	76.4	58.9	50	4.0
	November 11-15	21.9	64.0	65.3	50	4.3
	November 16-20	20.9	64.5	72.1	49	3.3
	November 21-25	19.7	66.8	62.8	40	3.3
	November 26-30	17.9	59.8	65.0	40	3.5
	December 1-5	14.5	67.9	62.9	40	2.7
	December 6-10	15.4	57.7	67.5	45	3.3
	December 11-15	17.1	52.6	70.9	50	3.2
	December 16-20	17.0	59.4	67.9	50	3.2
	December 21-25	16.1	54.8	66.6	50	2.7
	December 26-31	15.0	55.1	71.2	60	3.0
	January 1-5	16.2	51.4	68.2	49	3.3
	January 6-10	15.0	45.3	73.5	21	5.2
	January 11-15	10.9	54.4	(82.3)	8	2.6
	January 16-20	10.3	(51.2)	(71.9)	2	3.9
	All periods	17.7	65.3	66.4	794	100.0

State	Period	% mallards in duck bag	% Im in mallard bag	% males in Ad mallard bag	Total State season days	% of mallard bag per season day
Central Flyway						
North Dakota	October 1-5	43.1	54.4	72.9	7	46.0
	October 6-10	42.0	54.5	67.3	31	15.6
	October 11-15	49.5	51.9	68.1	46	9.3
	October 16-20	54.0	46.8	67.5	50	6.6
	October 21-25	59.6	53.6	64.9	50	6.9
	October 26-31	62.4	56.4	65.2	60	5.7
	November 1-5	70.6	56.4	65.8	48	4.6
	November 6-10	66.5	63.0	61.0	38	2.3
	November 11-15	83.4	61.5	67.2	29	1.6
	November 16-20	(85.8)[b/]	63.4	(68.4)	19	0.8
	November 21-25	(92.8)	(93.7)	(33.3)	15	0.4
	November 26-30	(75.0)	(50.0)	(50.0)	6	0.1
	Dec. 1-5	(--)	(--)	(--)	5	0
	Dec. 6-10	(--)	(--)	(--)	5	0
	Dec. 11-15	(--)	(--)	(--)	1	0
	All periods	53.6	53.9	67.5	410	99.9
Nebr.	October 1-5	20.3	28.8	60.9	4	9.4
	October 6-10	23.2	47.6	71.4	15	4.0
	October 11-15	30.4	45.2	67.2	23	4.2
	October 16-20	31.4	39.5	70.5	28	4.5
	October 21-25	39.8	34.4	74.7	30	4.4
	October 26-31	54.3	35.2	76.9	40	5.3
	November 1-5	62.5	40.2	79.1	35	5.9
	November 6-10	73.2	37.2	82.4	35	4.7
	November 11-15	75.7	38.9	81.3	33	6.6
	November 16-20	81.2	38.2	80.4	40	5.8
	November 21-25	83.2	40.0	78.9	45	6.1
	November 26-30	88.0	43.0	78.9	39	5.0
	December 1-5	92.3	32.2	81.0	35	4.2
	December 6-10	92.9	34.4	82.1	24	3.8
	December 11-15	97.3	20.4	85.8	13	6.5
	December 16-20	(94.9)	21.0	91.7	10	4.9
	December 21-25	(96.9)	(12.8)	(91.3)	10	2.3
	December 26-31	(90.8)	25.2	(94.2)	12	2.3
	Jan. 1-5	(97.7)	26.4	91.4	9	4.9
	Jan. 6-10	(93.2)	(21.6)	(87.8)	2	5.3
	All periods	60.1	37.3	77.9	482	100.1
Texas	November 1-5	6.3	(55.8)	(70.2)	2	11.9
	November 6-10	9.3	40.9	(79.3)	5	8.8
	November 11-15	12.9	36.6	(67.8)	5	8.2
	November 16-20	13.1	49.1	68.8	16	10.0
	November 21-25	13.5	48.3	64.1	28	7.6
	November 26-30	14.9	48.1	66.3	35	7.8
	December 1-5	14.2	36.7	62.7	40	4.8
	December 6-10	14.4	42.1	73.0	45	4.0
	December 11-15	14.4	36.8	73.7	47	4.0
	December 16-20	15.7	44.7	67.2	47	4.0
	December 21-25	16.4	43.2	72.5	45	4.2
	December 26-31	16.3	43.9	68.4	53	4.8
	Jan. 1-5	16.9	35.5	63.8	34	5.6
	Jan. 6-10	14.6	42.0	71.4	18	5.7
	Jan. 11-15	18.6	44.4	(75.9)	5	8.6
	All periods	15.2	42.6	67.8	425	100.0
Mississippi Flyway						
Minn.	October 1-5	30.1	77.6	41.3	10	50.5
	October 6-10	30.0	73.4	50.8	34	16.9
	October 11-15	32.2	69.3	48.4	43	10.0
	October 16-20	32.2	60.8	49.9	45	5.1
	October 21-25	33.5	63.9	52.8	45	5.0
	October 26-31	34.1	68.9	52.3	60	3.7
	November 1-5	34.6	63.4	49.3	50	3.0
	November 6-10	31.9	65.8	63.3	44	1.4
	November 11-15	41.0	70.6	44.5	27	1.9
	November 16-20	(51.1)	(72.1)	(43.3)	8	1.5
	November 21-25	(70.0)	(100.0)	(--)	1	1.1
	All periods	32.6	69.8	50.0	367	100.1

a/ Figures involving season days calculated using cumulative harvest for entire span of years; other figures calculated by adding annual estimates and dividing by number of years.

b/ Estimates in parentheses based on information pertaining to fewer than 100 ducks or 50 mallards. Dashes (—) indicate that no sample of birds was obtained for that period of the season.

Table A-14.--continued. Average characteristics, by 5-day period, of mallards harvested in selected States, 1961-1970. (All mallard bloodlines included; experimental San Luis Valley, September Teal, and Late Black Duck seasons and the scaup-only and sea duck-only dates excluded; Ad = adult, Im = immature.)

State	Period	% mallards in duck bag	% Im in mallard bag	% males in Ad mallard bag	Total State season days	% of mallard bag per season day
Mississippi Flyway						
Wisc.	October 1-5	27.9	79.6	43.7	6	42.0
	October 6-10	30.1	78.2	45.0	25	19.0
	October 11-15	35.7	73.8	43.5	44	13.1
	October 16-20	35.9	71.0	54.5	50	6.9
	October 21-25	34.0	68.1	47.8	50	5.1
	October 26-31	33.6	67.9	47.4	60	4.0
	November 1-5	31.9	69.8	56.9	50	3.1
	November 6-10	36.2	59.3	54.0	44	2.2
	November 11-15	32.5	69.4	66.8	29	2.5
	November 16-20	32.6	67.0	(68.6)	15	1.0
	November 21-25	(44.0)	(75.0)	(25.0)	6	0.6
	November 26-30	(39.8)	(100.0)	(--)	1	0.4
	All periods	33.5	72.5	48.9	380	99.9
Ill.	Oct. 16-20	41.6	54.7	75.2	4	20.4
	Oct. 21-25	38.9	49.1	68.9	9	15.2
	Oct. 26-31	48.2	50.4	67.3	29	13.9
	November 1-5	51.7	48.2	67.4	49	11.6
	November 6-10	59.2	50.5	65.5	50	7.4
	November 11-15	60.9	51.0	69.5	50	8.0
	November 16-20	65.3	51.6	71.5	49	5.8
	November 21-25	73.5	53.7	70.4	45	5.4
	November 26-30	69.4	53.8	68.9	41	5.2
	Dec. 1-5	72.2	56.1	69.6	31	3.9
	Dec. 6-10	72.8	50.6	87.3	13	3.3
	All periods	56.1	50.8	68.7	370	100.1
Ark.	Nov. 21-25	67.3	43.1	71.8	10	18.3
	Nov. 26-30	75.1	46.4	74.0	31	17.9
	December 1-5	71.6	49.1	71.0	39	9.4
	December 6-10	73.3	46.0	73.6	50	7.6
	December 11-15	79.3	45.8	73.5	50	7.0
	December 16-20	80.4	41.6	78.0	50	6.9
	December 21-25	79.3	38.0	77.3	48	6.6
	December 26-31	76.6	43.1	74.3	44	7.2
	Jan. 1-5	79.2	36.0	79.2	21	7.0
	Jan. 6-10	82.0	39.3	71.6	7	12.1
	All periods	76.1	42.6	74.8	350	100.0
Mississippi Flyway						
La.	November 6-10	19.9	45.7	56.8	5	16.6
	November 11-15	18.2	51.1	59.8	11	10.1
	November 16-20	19.9	48.3	61.0	21	10.0
	November 21-25	21.4	50.9	60.1	30	8.9
	November 26-30	22.3	47.9	63.4	31	7.9
	December 1-5	24.9	55.9	71.3	35	7.2
	December 6-10	24.1	46.4	66.6	35	5.6
	December 11-15	25.6	49.4	71.8	41	6.7
	December 16-20	25.2	49.8	67.6	45	5.1
	December 21-25	25.2	52.4	71.9	43	4.3
	December 26-31	20.6	45.3	65.8	37	4.2
	Jan. 1-5	27.4	59.0	64.5	18	5.5
	Jan. 6-10	23.2	34.0	(79.8)	14	3.5
	Jan. 11-15	25.2	(21.6)	(43.2)	4	4.3
	All periods	22.4	48.0	66.0	370	99.9
Atlantic Flyway						
N. Y. (Mainland)	October 1-5	34.3	89.1	(35.5)	1	51.3
	October 6-10	33.8	82.3	31.8	10	17.5
	October 11-15	28.1	79.1	44.3	24	12.2
	October 16-20	27.9	78.3	47.7	44	5.2
	October 21-25	28.6	75.3	42.8	45	2.4
	October 26-31	27.3	74.7	46.7	54	1.7
	November 1-5	23.4	74.8	53.4	49	1.5
	November 6-10	23.2	65.0	57.5	45	1.2
	November 11-15	21.4	68.4	64.8	45	1.0
	November 16-20	21.3	71.2	59.9	35	0.8
	November 21-25	23.2	61.4	75.8	25	0.7
	November 26-30	13.8	61.1	73.7	25	0.4
	December 1-5	41.1	59.6	(21.5)	16	0.5
	December 6-10	9.9	(85.5)	(81.1)	8	0.3
	December 10-15	13.7	(68.4)	(73.6)	7	0.4
	December 16-20	21.8	73.8	(66.1)	14	0.9
	December 21-25	13.1	(72.6)	(72.9)	19	0.5
	December 26-31	13.5	(79.6)	(61.7)	16	0.5
	Jan. 1-5	9.5	(83.0)	(74.8)	7	0.5
	Jan. 6-10	14.4	(72.6)	(68.9)	4	0.6
	All periods	26.4	77.0	47.6	493	100.1

Table A-15. Summary, by flyway, of annual Hunter Questionnaire Survey reports of the relative size of the unretrieved duck kill, 1952-1974. (Ratios derived from figures tabulated by State of duck stamp purchase without adjustment for response biases; all U.S. waterfowl seasons included.)

Hunting season	Unretrived kill rate (ducks lost per duck brought down)						
	Alaska	Pacific Flyway	Central Flyway	Mississippi Flyway	Atlantic Flyway	Entire United States Excluding Alaska	Entire United States Including Alaska
1952-53	0.135	0.147	0.180	0.197	0.212	0.179	0.179
1953-54	0.105	0.120	0.147	0.168	0.192	0.150	0.150
1954-55	0.103	0.133	0.146	0.167	0.174	0.153	0.152
1955-56	0.129	0.128	0.141	0.175	0.182	0.156	0.155
1956-57	↑	0.134	0.139	0.168	0.186	0.154	↑
1957-58		0.125	0.136	0.158	0.179	0.145	
1958-59		0.130	0.142	0.175	0.184	0.154	
1959-60		0.116	0.120	0.151	0.170	0.136	
1960-61		0.125	0.143	0.173	0.171	0.152	
1961-62		0.127	0.140	0.166	0.171	0.148	
1962-63		0.145	0.166	0.178	0.187	0.164	
1963-64		0.135	0.156	0.175	0.178	0.158	
1964-65	↓	0.144	0.153	0.164	0.177	0.158	↓
1965-66	0.131	0.141	0.171	0.158	0.185	0.157	0.157
1966-67	0.130	0.127	0.155	0.158	0.173	0.150	0.150
1967-68	0.120	0.133	0.146	0.153	0.180	0.148	0.148
1968-69	0.118	0.140	0.143	0.171	0.170	0.155	0.154
1969-70	0.137	0.132	0.149	0.158	0.171	0.150	0.150
1970-71	0.115	0.127	0.133	0.147	0.172	0.142	0.142
1971-72	0.112	0.126	0.146	0.157	0.172	0.148	0.147
1972-73	0.117	0.119	0.141	0.164	0.179	0.148	0.148
1973-74	0.119	0.132	0.135	0.152	0.180	0.147	0.146
1974-75	0.101	0.123	0.145	0.152	0.169	0.145	0.144

Not in survey

Alaska not in survey

Table A-16. Average unretrieved kill rates for ducks, by State, based on Hunter Questionnaire Survey data, 1952-1971. (Calculated using unadjusted and adjusted bag data; long-term ratios derived by averaging annual ratios.)

State and Flyway	Ducks lost per duck brought down	
	Unadjusted	Adjusted
Alaska	0.121	0.149
Pacific Flyway		
Washington	0.128	0.156
Oregon	0.126	0.154
Idaho	0.132	0.161
Montana	0.130	0.160
Wyoming	0.108	0.133
California	0.132	0.162
Nevada	0.128	0.156
Utah	0.156	0.189
Colorado	0.134	0.164
Arizona	0.107	0.132
New Mexico	0.155	0.188
Central Flyway		
Montana	0.135	0.174
North Dakota	0.202	0.256
South Dakota	0.180	0.228
Wyoming	0.110	0.143
Nebraska	0.121	0.157
Colorado	0.132	0.170
Kansas	0.118	0.154
New Mexico	0.114	0.148
Oklahoma	0.118	0.154
Texas	0.139	0.179
Mississippi Flyway		
Minnesota	0.191	0.234
Wisconsin	0.170	0.208
Michigan	0.200	0.243
Iowa	0.152	0.187
Illinois	0.133	0.165
Indiana	0.164	0.201
Ohio	0.171	0.210
Missouri	0.124	0.154
Kentucky	0.162	0.199
Arkansas	0.144	0.178
Tennessee	0.170	0.208
Louisiana	0.154	0.190
Mississippi	0.185	0.226
Alabama	0.179	0.219
Atlantic Flyway		
Maine	0.193	0.215
Vermont	0.192	0.215
New Hampshire	0.198	0.221
Massachusetts	0.199	0.222
Connecticut	0.185	0.208
Rhode Island	0.163	0.183
New York	0.180	0.202
Pennsylvania	0.186	0.208
West Virginia	0.129	0.146
New Jersey	0.177	0.198
Delaware	0.160	0.180
Maryland	0.134	0.151
Virginia	0.153	0.172
North Carolina	0.172	0.193
South Carolina	0.197	0.220
Georgia	0.203	0.226
Florida	0.195	0.218

Table A-17. Expected size and composition of the duck bag for various combinations of duck (D) bag limits and mallard (M) restrictions through a bag of six under a variety of conditions of mallard availability to hunters. (Baseline data on successful hunter-days are those showing no mallard restrictions; the basic opportunity curve used is that calculated for the 1963-1966 period in the San Luis Valley where the average probability of encountering an additional duck was about 0.77.)

Mallard availability (incidence in bag with no mallard restriction)	Daily duck bag limit	Expected duck bag ($\bar{x}$ D), mallard bag ($\bar{x}$ M), and percent mallards (100M ÷ D = % M) per successful hunter-day for bag limit regulations where mallards are restricted to:																				
		0			1			2			3			4			5			6		
		$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M
5.00%	1	0.950	0	0	1.000	0.050	5.0															
	2	1.717	0	0	1.805	0.088	4.9	1.807	0.090	5.0												
	3	2.289	0	0	2.404	0.116	4.8	2.409	0.120	5.0	2.409	0.121	5.0									
	4	2.730	0	0	2.865	0.135	4.7	2.873	0.143	5.0	2.874	0.144	5.0	2.874	0.144	5.0						
	5	3.064	0	0	3.214	0.150	4.7	3.225	0.161	5.0	3.225	0.161	5.0	3.225	0.161	5.0	3.225	0.161	5.0			
	6	3.317	0	0	3.477	0.160	4.6	3.490	0.174	5.0	3.491	0.175	5.0	3.491	0.175	5.0	3.491	0.175	5.0	3.491	0.175	5.0
10.00%	1	0.900	0	0	1.000	0.100	10.0															
	2	1.626	0	0	1.799	0.173	9.6	1.807	0.181	10.0												
	3	2.168	0	0	2.390	0.221	9.3	2.409	0.240	10.0	2.409	0.241	10.0									
	4	2.586	0	0	2.842	0.255	9.0	2.872	0.285	9.9	2.874	0.287	10.0	2.874	0.287	10.0						
	5	2.903	0	0	3.181	0.278	8.7	3.221	0.319	9.9	3.225	0.322	10.0	3.225	0.323	10.0	3.225	0.323	10.0			
	6	3.142	0	0	3.436	0.294	8.6	3.485	0.343	9.8	3.491	0.349	10.0	3.491	0.349	10.0	3.491	0.349	10.0	3.491	0.349	10.0
15.00%	1	0.850	0	0	1.000	0.150	15.0															
	2	1.536	0	0	1.789	0.253	14.1	1.807	0.271	15.0												
	3	2.048	0	0	2.366	0.318	13.4	2.407	0.359	14.9	2.409	0.361	15.0									
	4	2.443	0	0	2.804	0.361	12.9	2.868	0.425	14.8	2.874	0.431	15.0	2.874	0.431	15.0						
	5	2.741	0	0	3.129	0.388	12.4	3.213	0.472	14.7	3.224	0.483	15.0	3.225	0.484	15.0	3.225	0.484	15.0			
	6	2.968	0	0	3.374	0.406	12.0	3.473	0.505	14.5	3.490	0.522	15.0	3.491	0.524	15.0	3.491	0.524	15.0	3.491	0.524	15.0
20.00%	1	0.800	0	0	1.000	0.200	20.0															
	2	1.446	0	0	1.775	0.329	18.5	1.807	0.361	20.0												
	3	1.927	0	0	2.334	0.406	17.4	2.404	0.477	19.8	2.409	0.482	20.0									
	4	2.299	0	0	2.753	0.454	16.5	2.859	0.560	19.6	2.873	0.574	20.0	2.874	0.575	20.0						
	5	2.580	0	0	3.063	0.483	15.8	3.198	0.618	19.3	3.222	0.642	19.9	3.225	0.645	20.0	3.225	0.645	20.0			
	6	2.793	0	0	3.293	0.500	15.2	3.450	0.657	19.0	3.485	0.693	19.9	3.491	0.698	20.0	3.491	0.698	20.0	3.491	0.698	20.0
25.00%	1	0.750	0	0	1.000	0.250	25.0															
	2	1.355	0	0	1.757	0.401	22.8	1.807	0.452	25.0												
	3	1.807	0	0	2.293	0.486	21.2	2.400	0.593	24.7	2.409	0.602	25.0									
	4	2.155	0	0	2.690	0.535	19.9	2.846	0.691	24.3	2.872	0.717	25.0	2.874	0.718	25.0						
	5	2.419	0	0	2.982	0.563	18.9	3.175	0.756	23.8	3.219	0.800	24.9	3.225	0.806	25.0	3.225	0.806	25.0			
	6	2.618	0	0	3.197	0.579	18.1	3.416	0.798	23.4	3.478	0.860	24.7	3.490	0.871	25.0	3.491	0.873	25.0	3.491	0.873	25.0
30.00%	1	0.700	0	0	1.000	0.300	30.0															
	2	1.265	0	0	1.735	0.470	27.1	1.807	0.542	30.0												
	3	1.687	0	0	2.245	0.558	24.9	2.394	0.707	29.5	2.409	0.723	30.0									
	4	2.012	0	0	2.618	0.606	23.2	2.828	0.816	28.9	2.870	0.858	29.9	2.874	0.862	30.0						
	5	2.258	0	0	2.889	0.631	21.8	3.142	0.884	28.1	3.213	0.955	29.7	3.225	0.967	30.0	3.225	0.968	30.0			
	6	2.444	0	0	3.089	0.645	20.9	3.371	0.927	27.5	3.466	1.022	29.5	3.488	1.044	29.9	3.491	1.047	30.0	3.491	1.047	30.0
33.33%	1	0.667	0	0	1.000	0.333	33.3															
	2	1.205	0	0	1.718	0.513	29.9	1.807	0.602	33.3												
	3	1.606	0	0	2.208	0.602	27.3	2.387	0.781	32.7	2.409	0.803	33.3									
	4	1.916	0	0	2.564	0.648	25.3	2.811	0.895	31.9	2.868	0.952	33.2	2.874	0.958	33.3						
	5	2.150	0	0	2.821	0.671	23.8	3.115	0.965	31.0	3.206	1.056	32.9	3.224	1.074	33.3	3.225	1.075	33.3			
	6	2.327	0	0	3.010	0.683	22.7	3.333	1.006	30.2	3.454	1.126	32.6	3.486	1.158	33.3	3.491	1.163	33.3	3.491	1.164	33.3
40.00%	1	0.600	0	0	1.000	0.400	40.0															
	2	1.084	0	0	1.678	0.594	35.4	1.807	0.723	40.0												
	3	1.446	0	0	2.126	0.680	32.0	2.371	0.925	39.0	2.409	0.964	40.0									
	4	1.724	0	0	2.445	0.721	29.5	2.770	1.046	37.7	2.862	1.138	39.8	2.874	1.149	40.0						
	5	1.935	0	0	2.674	0.739	27.6	3.047	1.112	36.5	3.188	1.253	39.3	3.222	1.286	39.9	3.225	1.290	40.0			
	6	2.095	0	0	2.842	0.747	26.3	3.243	1.148	35.4	3.420	1.326	38.8	3.478	1.384	39.8	3.490	1.395	40.0	3.491	1.396	40.0
45.00%	1	0.550	0	0	1.000	0.450	45.0															
	2	0.994	0	0	1.644	0.650	39.5	1.807	0.813	45.0												
	3	1.325	0	0	2.057	0.732	35.6	2.354	1.029	43.7	2.409	1.084	45.0									
	4	1.580	0	0	2.347	0.767	32.7	2.729	1.149	42.1	2.854	1.274	44.6	2.874	1.293	45.0						
	5	1.774	0	0	2.555	0.781	30.6	2.988	1.211	40.6	3.168	1.394	44.0	3.219	1.445	44.9	3.225	1.451	45.0			
	6	1.920	0	0	2.707	0.787	29.1	3.162	1.242	39.3	3.385	1.465	43.3	3.469	1.549	44.7	3.489	1.569	45.0	3.491	1.571	45.0

Table A-17.--continued. Expected size and composition of the duck bag for various combinations of duck (D) bag limits and mallard (M) restrictions through a bag of six under a variety of conditions of mallard availability to hunters. (Baseline data on successful hunter-days are those showing no mallard restrictions; the basic opportunity curve used is that calculated for the 1963-1966 period in the San Luis Valley where the average probability of encountering an additional duck was about 0.77.)

Mallard availability (incidence in bag with no mallard restriction)	Daily duck bag limit	Expected duck bag ($\bar{x}$ D), mallard bag ($\bar{x}$ M), and percent mallards (100M ÷ D = % M) per successful hunter-day for bag limit regulations where mallards are restricted to:																				
		0			1			2			3			4			5			6		
		$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M
50.00%	1	0.500	0	0	1.000	0.500	50.0															
	2	0.904	0	0	1.605	0.702	43.7	1.807	0.904	50.0												
	3	1.205	0	0	1.982	0.777	39.2	2.334	1.129	48.4	2.409	1.205	50.0									
	4	1.437	0	0	2.243	0.806	35.9	2.682	1.245	46.4	2.845	1.408	49.5	2.874	1.437	50.0						
	5	1.613	0	0	2.430	0.817	33.6	2.913	1.300	44.6	3.141	1.529	48.7	3.214	1.602	49.8	3.225	1.613	50.0			
	6	1.746	0	0	2.567	0.821	32.0	3.071	1.325	43.2	3.341	1.595	47.7	3.455	1.710	49.5	3.487	1.741	49.9	3.491	1.746	50.0
55.00%	1	0.450	0	0	1.000	0.550	55.0															
	2	0.813	0	0	1.563	0.750	48.0	1.807	0.994	55.0												
	3	1.084	0	0	1.901	0.817	43.0	2.309	1.225	53.0	2.409	1.325	55.0									
	4	1.293	0	0	2.133	0.840	39.4	2.627	1.334	50.8	2.831	1.538	54.3	2.874	1.580	55.0						
	5	1.451	0	0	2.299	0.848	36.9	2.831	1.380	48.7	3.107	1.656	53.3	3.207	1.756	54.8	3.225	1.774	55.0			
	6	1.571	0	0	2.422	0.851	35.1	2.970	1.399	47.1	3.286	1.715	52.2	3.436	1.865	54.3	3.484	1.913	54.9	3.491	1.920	55.0
60.00%	1	0.400	0	0	1.000	0.600	60.0															
	2	0.723	0	0	1.517	0.794	52.3	1.807	1.084	60.0												
	3	0.964	0	0	1.815	0.852	46.9	2.279	1.316	57.7	2.409	1.446	60.0									
	4	1.149	0	0	2.019	0.869	43.1	2.563	1.414	55.2	2.813	1.664	59.1	2.874	1.724	60.0						
	5	1.290	0	0	2.165	0.875	40.4	2.741	1.451	52.9	3.065	1.775	57.9	3.198	1.908	59.7	3.225	1.935	60.0			
	6	1.396	0	0	2.273	0.876	38.6	2.862	1.465	51.2	3.222	1.825	56.7	3.410	2.014	59.0	3.479	2.082	59.9	3.491	2.095	60.0
66.67%	1	0.333	0	0	1.000	0.667	66.7															
	2	0.602	0	0	1.448	0.846	58.4	1.807	1.205	66.7												
	3	0.803	0	0	1.694	0.891	52.6	2.231	1.428	64.0	2.409	1.606	66.7									
	4	0.958	0	0	1.860	0.902	48.5	2.466	1.508	61.2	2.782	1.824	65.6	2.874	1.916	66.7						
	5	1.075	0	0	1.980	0.905	45.7	2.609	1.534	58.8	2.995	1.919	64.1	3.179	2.104	66.2	3.225	2.150	66.7			
	6	1.164	0	0	2.069	0.906	43.8	2.706	1.542	57.0	3.120	1.957	62.7	3.363	2.199	65.4	3.468	2.304	66.4	3.491	2.327	66.7
70.00%	1	0.300	0	0	1.000	0.700	70.0															
	2	0.542	0	0	1.412	0.870	61.6	1.807	1.265	70.0												
	3	0.723	0	0	1.630	0.907	55.7	2.203	1.480	67.2	2.409	1.687	70.0									
	4	0.862	0	0	1.778	0.916	51.5	2.412	1.550	64.3	2.762	1.900	68.8	2.874	2.012	70.0						
	5	0.968	0	0	1.886	0.918	48.7	2.539	1.571	61.9	2.954	1.986	67.2	3.166	2.198	69.4	3.225	2.258	70.0			
	6	1.047	0	0	1.966	0.919	46.7	2.624	1.577	60.1	3.063	2.016	65.8	3.333	2.286	68.6	34.60	2.413	69.7	3.491	2.444	70.0
75.00%	1	0.250	0	0	1.000	0.750	75.0															
	2	0.452	0	0	1.353	0.901	66.6	1.807	1.355	75.0												
	3	0.602	0	0	1.532	0.930	60.7	2.155	1.553	72.1	2.409	1.807	75.0									
	4	0.718	0	0	1.653	0.935	56.6	2.326	1.607	69.1	2.727	2.008	73.7	2.874	2.155	75.0						
	5	0.806	0	0	1.742	0.936	53.7	2.427	1.621	66.8	2.884	2.077	72.0	3.142	2.335	75.3	3.225	2.419	75.0			
	6	0.873	0	0	1.809	0.936	51.8	2.497	1.624	65.0	2.971	2.098	70.6	3.281	2.409	73.4	3.444	2.571	74.7	3.491	2.618	75.0
80.00%	1	0.200	0	0	1.000	0.800	80.0															
	2	0.361	0	0	1.291	0.929	72.0	1.807	1.446	80.0												
	3	0.482	0	0	1.430	0.948	66.3	2.101	1.619	77.1	2.409	1.927	80.0									
	4	0.575	0	0	1.526	0.951	62.3	2.233	1.658	74.3	2.683	2.109	78.6	2.874	2.299	80.0						
	5	0.645	0	0	1.597	0.952	59.6	2.310	1.665	72.1	2.805	2.160	77.0	3.110	2.465	79.3	3.225	2.580	80.0			
	6	0.698	0	0	1.650	0.952	57.7	2.365	1.667	70.5	2.870	2.172	75.7	3.219	2.521	78.3	3.421	2.723	79.6	3.491	2.793	80.0
85.00%	1	0.150	0	0	1.000	0.850	85.0															
	2	0.271	0	0	1.224	0.953	77.9	1.807	1.536	85.0												
	3	0.361	0	0	1.325	0.964	72.7	2.039	1.678	82.3	2.409	2.048	85.0									
	4	0.431	0	0	1.397	0.966	69.1	2.133	1.702	80.0	2.631	2.200	83.6	2.874	2.443	85.0						
	5	0.484	0	0	1.450	0.966	66.6	2.190	1.706	77.9	2.717	2.233	82.2	3.069	2.585	84.2	3.225	2.741	85.0			
	6	0.524	0	0	1.490	0.966	64.8	2.230	1.706	76.5	2.763	2.239	81.0	3.147	2.623	83.4	3.391	2.867	84.6	3.491	2.968	85.0
90.00%	1	0.100	0	0	1.000	0.900	90.0															
	2	0.181	0	0	1.153	0.973	84.3	1.807	1.626	90.0												
	3	0.241	0	0	1.219	0.978	80.2	1.970	1.729	87.8	2.409	2.168	90.0									
	4	0.287	0	0	1.266	0.978	77.3	2.028	1.741	85.8	2.569	2.282	88.8	2.874	2.586	90.0						
	5	0.323	0	0	1.301	0.979	75.2	2.065	1.742	84.4	2.621	2.298	87.7	3.018	2.695	89.3	3.225	2.903	90.0			
	6	0.349	0	0	1.328	0.979	73.7	2.092	1.742	83.3	2.649	2.300	86.8	3.064	2.715	88.6	3.350	3.001	89.6	3.491	3.142	90.0

Table A-18. Expected size and composition of the duck bag for various combinations of duck (D) bag limits and mallard (M) restrictions through a bag of six under a variety of conditions of mallard availability to hunters. (Baseline data on successful hunter-days are those showing no mallard restrictions; the basic opportunity curve used is that calculated for the 1964-1968 period in the Columbia Basin where the average probability of encountering an additional duck was about 0.64.)

Mallard availability (incidence in bag with no mallard restriction)	Daily duck bag limit	Expected duck bag ($\bar{x}$ D), mallard bag ($\bar{x}$ M), and percent mallards (100M ÷ D = % M) per successful hunter-day for bag limit regulations where mallards are restricted to:																				
		0			1			2			3			4			5			6		
		$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M
5.00%	1	0.950	0	0	1.000	0.050	5.0															
	2	1.568	0	0	1.649	0.081	4.9	1.650	0.082	5.0												
	3	1.966	0	0	2.066	0.100	4.8	2.069	0.103	5.0	2.070	0.104	5.0									
	4	2.223	0	0	2.334	0.111	4.8	2.340	0.117	5.0	2.340	0.117	5.0	2.340	0.117	5.0						
	5	2.384	0	0	2.502	0.118	4.7	2.510	0.125	5.0	2.510	0.125	5.0	2.510	0.125	5.0	2.510	0.125	5.0			
	6	2.470	0	0	2.592	0.122	4.7	2.600	0.130	5.0	2.600	0.130	5.0	2.600	0.130	5.0	2.600	0.130	5.0	2.600	0.130	5.0
10.00%	1	0.900	0	0	1.000	0.100	10.0															
	2	1.485	0	0	1.643	0.158	9.6	1.650	0.165	10.0												
	3	1.863	0	0	2.056	0.193	9.4	2.070	0.207	10.0	2.070	0.207	10.0									
	4	2.106	0	0	2.318	0.212	9.2	2.339	0.233	10.0	2.340	0.234	10.0	2.340	0.234	10.0						
	5	2.259	0	0	2.482	0.223	9.0	2.508	0.249	9.9	2.510	0.251	10.0	2.510	0.251	10.0	2.510	0.251	10.0			
	6	2.340	0	0	2.569	0.229	8.9	2.597	0.257	9.9	2.600	0.260	10.0	2.600	0.260	10.0	2.600	0.260	10.0	2.600	0.260	10.0
15.00%	1	0.850	0	0	1.000	0.150	15.0															
	2	1.402	0	0	1.635	0.233	14.2	1.650	0.248	15.0												
	3	1.760	0	0	2.038	0.278	13.7	2.069	0.309	14.9	2.070	0.310	15.0									
	4	1.989	0	0	2.292	0.303	13.2	2.336	0.347	14.9	2.340	0.351	15.0	2.340	0.351	15.0						
	5	2.134	0	0	2.450	0.317	12.9	2.503	0.370	14.8	2.510	0.376	15.0	2.510	0.376	15.0	2.510	0.376	15.0			
	6	2.210	0	0	2.533	0.323	12.7	2.591	0.381	14.7	2.599	0.389	15.0	2.600	0.390	15.0	2.600	0.390	15.0	2.600	0.390	15.0
20.00%	1	0.800	0	0	1.000	0.200	20.0															
	2	1.320	0	0	1.624	0.304	18.7	1.650	0.330	20.0												
	3	1.656	0	0	2.014	0.358	17.8	2.067	0.411	19.9	2.070	0.414	20.0									
	4	1.872	0	0	2.257	0.385	17.1	2.331	0.459	19.7	2.340	0.468	20.0	2.340	0.468	20.0						
	5	2.008	0	0	2.407	0.399	16.6	2.495	0.487	19.5	2.509	0.501	20.0	2.510	0.502	20.0	2.510	0.502	20.0			
	6	2.080	0	0	2.485	0.405	16.3	2.580	0.500	19.4	2.598	0.518	19.9	2.600	0.520	20.0	2.600	0.520	20.0	2.600	0.520	20.0
25.00%	1	0.750	0	0	1.000	0.250	25.0															
	2	1.238	0	0	1.609	0.372	23.1	1.650	0.412	25.0												
	3	1.552	0	0	1.983	0.431	21.7	2.063	0.511	24.8	2.070	0.518	25.0									
	4	1.755	0	0	2.214	0.459	20.7	2.323	0.568	24.4	2.339	0.584	25.0	2.340	0.585	25.0						
	5	1.882	0	0	2.355	0.473	20.1	2.482	0.599	24.1	2.507	0.624	24.9	2.510	0.627	25.0	2.510	0.628	25.0			
	6	1.950	0	0	2.428	0.478	19.7	2.564	0.614	23.9	2.594	0.644	24.8	2.599	0.649	25.0	2.600	0.650	25.0	2.600	0.650	25.0
30.00%	1	0.700	0	0	1.000	0.300	30.0															
	2	1.155	0	0	1.591	0.436	27.4	1.650	0.495	30.0												
	3	1.449	0	0	1.947	0.498	25.6	2.059	0.610	29.6	2.070	0.621	30.0									
	4	1.638	0	0	2.164	0.526	24.3	2.311	0.673	29.1	2.338	0.700	29.9	2.340	0.702	30.0						
	5	1.757	0	0	2.295	0.538	23.5	2.463	0.706	28.7	2.504	0.747	29.8	2.510	0.753	30.0	2.510	0.753	30.0			
	6	1.820	0	0	2.363	0.543	23.0	2.541	0.721	28.4	2.589	0.769	29.7	2.599	0.779	30.0	2.600	0.780	30.0	2.600	0.780	30.0
33.33%	1	0.667	0	0	1.000	0.333	33.3															
	2	1.100	0	0	1.578	0.478	30.3	1.650	0.550	33.3												
	3	1.380	0	0	1.920	0.540	28.1	2.054	0.674	32.8	2.070	0.690	33.3									
	4	1.560	0	0	2.127	0.567	26.6	2.301	0.741	32.2	2.337	0.777	33.2	2.340	0.780	33.3						
	5	1.673	0	0	2.251	0.578	25.7	2.448	0.775	31.6	2.500	0.827	33.1	2.509	0.836	33.3	2.510	0.837	33.3			
	6	1.733	0	0	2.315	0.582	25.1	2.522	0.789	31.3	2.584	0.851	32.9	2.598	0.865	33.3	2.600	0.867	33.3	2.600	0.867	33.3
40.00%	1	0.600	0	0	1.000	0.400	40.0															
	2	0.990	0	0	1.546	0.556	36.0	1.650	0.660	40.0												
	3	1.242	0	0	1.858	0.616	33.2	2.043	0.801	39.2	2.070	0.828	40.0									
	4	1.404	0	0	2.044	0.640	31.3	2.275	0.871	38.3	2.333	0.929	39.8	2.340	0.936	40.0						
	5	1.506	0	0	2.155	0.649	30.1	2.409	0.903	37.5	2.491	0.985	39.5	2.508	1.002	40.0	2.510	1.004	40.0			
	6	1.560	0	0	2.211	0.651	29.5	2.476	0.916	37.0	2.569	1.009	39.3	2.595	1.035	39.9	2.600	1.040	40.0	2.600	1.040	40.0
45.00%	1	0.550	0	0	1.000	0.450	45.0															
	2	0.908	0	0	1.518	0.611	40.2	1.650	0.742	45.0												
	3	1.138	0	0	1.807	0.668	37.0	2.032	0.893	44.0	2.070	0.932	45.0									
	4	1.287	0	0	1.975	0.688	34.8	2.250	0.963	42.8	2.329	1.042	44.7	2.340	1.053	45.0						
	5	1.380	0	0	2.076	0.695	33.5	2.373	0.993	41.8	2.480	1.100	44.3	2.507	1.126	44.9	2.510	1.130	45.0			
	6	1.430	0	0	2.127	0.697	32.8	2.433	1.003	41.2	2.554	1.124	44.0	2.592	1.162	44.8	2.599	1.169	45.0	2.600	1.170	45.0

Table A-18.--continued. Expected size and composition of the duck bag for various combinations of duck (D) bag limits and mallard (M) restrictions through a bag of six under a variety of conditions of mallard availability to hunters. (Baseline data on successful hunter-days are those showing no mallard restrictions; the basic opportunity curve used is that calculated for the 1964-1968 period in the Columbia Basin where the average probability of encountering an additional duck was about 0.64.)

Mallard availability (incidence in bag with no mallard restriction)	Daily duck bag limit	Expected duck bag ($\bar{x}$ D), mallard bag ($\bar{x}$ M), and percent mallards (100M÷D = % M) per successful hunter-day for bag limit regulations where mallards are restricted to:																				
		0			1			2			3			4			5			6		
		$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M	$\bar{x}$ D	$\bar{x}$ M	% M
50.00%	1	0.500	0	0	1.000	0.500	50.0															
	2	0.825	0	0	1.487	0.662	44.5	1.650	0.825	50.0												
	3	1.035	0	0	1.750	0.715	40.9	2.017	0.982	48.7	2.070	1.035	50.0									
	4	1.170	0	0	1.902	0.732	38.5	2.220	1.050	47.3	2.323	1.153	49.6	2.340	1.170	50.0						
	5	1.255	0	0	1.992	0.737	37.0	2.332	1.077	46.2	2.467	1.212	49.1	2.505	1.250	49.9	2.510	1.255	50.0			
	6	1.300	0	0	2.039	0.739	36.2	2.385	1.085	45.5	2.534	1.234	48.7	2.586	1.286	49.7	2.599	1.299	50.0	2.600	1.300	50.0
55.00%	1	0.450	0	0	1.000	0.550	55.0															
	2	0.742	0	0	1.453	0.711	48.9	1.650	0.908	55.0												
	3	0.932	0	0	1.690	0.758	44.8	2.001	1.069	53.4	2.070	1.138	55.0									
	4	1.053	0	0	1.824	0.771	42.3	2.185	1.132	51.8	2.315	1.262	54.5	2.340	1.287	55.0						
	5	1.130	0	0	1.905	0.775	40.7	2.284	1.154	50.5	2.449	1.319	53.9	2.501	1.372	54.8	2.510	1.380	55.0			
	6	1.170	0	0	1.946	0.776	39.9	2.331	1.161	49.8	2.509	1.339	53.4	2.579	1.409	54.6	2.598	1.428	55.0	2.600	1.430	55.0
60.00%	1	0.400	0	0	1.000	0.600	60.0															
	2	0.660	0	0	1.416	0.756	53.4	1.650	0.990	60.0												
	3	0.828	0	0	1.624	0.796	49.0	1.979	1.151	58.2	2.070	1.242	60.0									
	4	0.936	0	0	1.743	0.807	46.3	2.144	1.208	56.3	2.305	1.369	59.4	2.340	1.404	60.0						
	5	1.004	0	0	1.813	0.809	44.6	2.231	1.227	55.0	2.427	1.423	58.6	2.497	1.493	59.8	2.510	1.506	60.0			
	6	1.040	0	0	1.850	0.810	43.8	2.271	1.231	54.2	2.480	1.440	58.1	2.569	1.529	59.5	2.596	1.556	59.9	2.600	1.560	60.0
66.67%	1	0.333	0	0	1.000	0.667	66.7															
	2	0.550	0	0	1.361	0.811	59.6	1.650	1.100	66.7												
	3	0.690	0	0	1.532	0.842	55.0	1.946	1.256	64.5	2.070	1.380	66.7									
	4	0.780	0	0	1.629	0.849	52.1	2.082	1.302	62.5	2.287	1.507	65.9	2.340	1.560	66.7						
	5	0.837	0	0	1.687	0.850	50.4	2.152	1.315	61.1	2.390	1.553	65.0	2.488	1.651	66.4	2.510	1.673	66.7			
	6	0.867	0	0	1.718	0.851	49.5	2.185	1.318	60.3	2.432	1.565	64.4	2.550	1.683	66.0	2.592	1.725	66.6	2.600	1.733	66.7
70.00%	1	0.300	0	0	1.000	0.700	70.0															
	2	0.495	0	0	1.332	0.837	62.8	1.650	1.155	70.0												
	3	0.621	0	0	1.484	0.863	58.2	1.926	1.305	67.8	2.070	1.449	70.0									
	4	0.702	0	0	1.570	0.868	55.3	2.048	1.346	65.7	2.275	1.573	69.1	2.340	1.638	70.0						
	5	0.753	0	0	1.622	0.869	53.6	2.109	1.356	64.3	2.368	1.615	68.2	2.481	1.728	69.6	2.510	1.757	70.0			
	6	0.780	0	0	1.649	0.869	52.7	2.138	1.358	63.5	2.405	1.625	67.6	2.538	1.758	69.3	2.589	1.809	69.9	2.600	1.820	70.0
75.00%	1	0.250	0	0	1.000	0.750	75.0															
	2	0.412	0	0	1.284	0.872	67.9	1.650	1.238	75.0												
	3	0.518	0	0	1.410	0.892	63.3	1.893	1.375	72.7	2.070	1.553	75.0									
	4	0.585	0	0	1.480	0.895	60.5	1.992	1.407	70.6	2.255	1.670	74.1	2.340	1.755	75.0						
	5	0.628	0	0	1.523	0.895	58.8	2.041	1.413	69.2	2.331	1.703	73.1	2.470	1.842	74.6	2.510	1.883	75.0			
	6	0.650	0	0	1.545	0.895	57.9	2.064	1.414	68.5	2.360	1.710	72.5	2.517	1.867	74.2	2.584	1.934	74.8	2.600	1.950	75.0
80.00%	1	0.200	0	0	1.000	0.800	80.0															
	2	0.330	0	0	1.234	0.904	73.4	1.650	1.320	80.0												
	3	0.414	0	0	1.331	0.917	68.9	1.855	1.441	77.7	2.070	1.656	80.0									
	4	0.468	0	0	1.387	0.919	66.3	1.931	1.463	75.8	2.229	1.761	79.0	2.340	1.872	80.0						
	5	0.502	0	0	1.421	0.919	64.7	1.969	1.467	74.5	2.288	1.786	78.1	2.454	1.952	79.5	2.510	2.008	80.0			
	6	0.520	0	0	1.439	0.919	63.9	1.988	1.468	73.8	2.310	1.790	77.5	2.491	1.971	79.1	2.576	2.056	79.8	2.600	2.080	80.0
85.00%	1	0.150	0	0	1.000	0.850	85.0															
	2	0.248	0	0	1.181	0.933	79.0	1.650	1.402	85.0												
	3	0.310	0	0	1.251	0.941	75.2	1.812	1.502	82.9	2.070	1.760	85.0									
	4	0.351	0	0	1.293	0.942	72.9	1.867	1.516	81.2	2.199	1.848	84.0	2.340	1.989	85.0						
	5	0.376	0	0	1.318	0.942	71.4	1.893	1.517	80.1	2.240	1.864	83.2	2.434	2.058	84.5	2.510	2.134	85.0			
	6	0.390	0	0	1.332	0.942	70.7	1.907	1.517	79.5	2.256	1.866	82.7	2.461	2.071	84.2	2.566	2.176	84.8	2.600	2.210	85.0
90.00%	1	0.100	0	0	1.000	0.900	90.0															
	2	0.165	0	0	1.124	0.959	85.3	1.650	1.485	90.0												
	3	0.207	0	0	1.169	0.962	82.3	1.764	1.557	88.3	2.070	1.863	90.0									
	4	0.234	0	0	1.197	0.963	80.5	1.798	1.564	87.0	2.163	1.929	89.2	2.340	2.106	90.0						
	5	0.251	0	0	1.214	0.963	79.3	1.815	1.564	86.2	2.188	1.937	88.5	2.410	2.159	89.6	2.510	2.259	90.0			
	6	0.260	0	0	1.223	0.963	78.7	1.824	1.564	85.7	2.198	1.938	88.2	2.425	2.165	89.3	2.552	2.292	89.8	2.600	2.340	90.0

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As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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